ENGINEERING NEWS-RECORD

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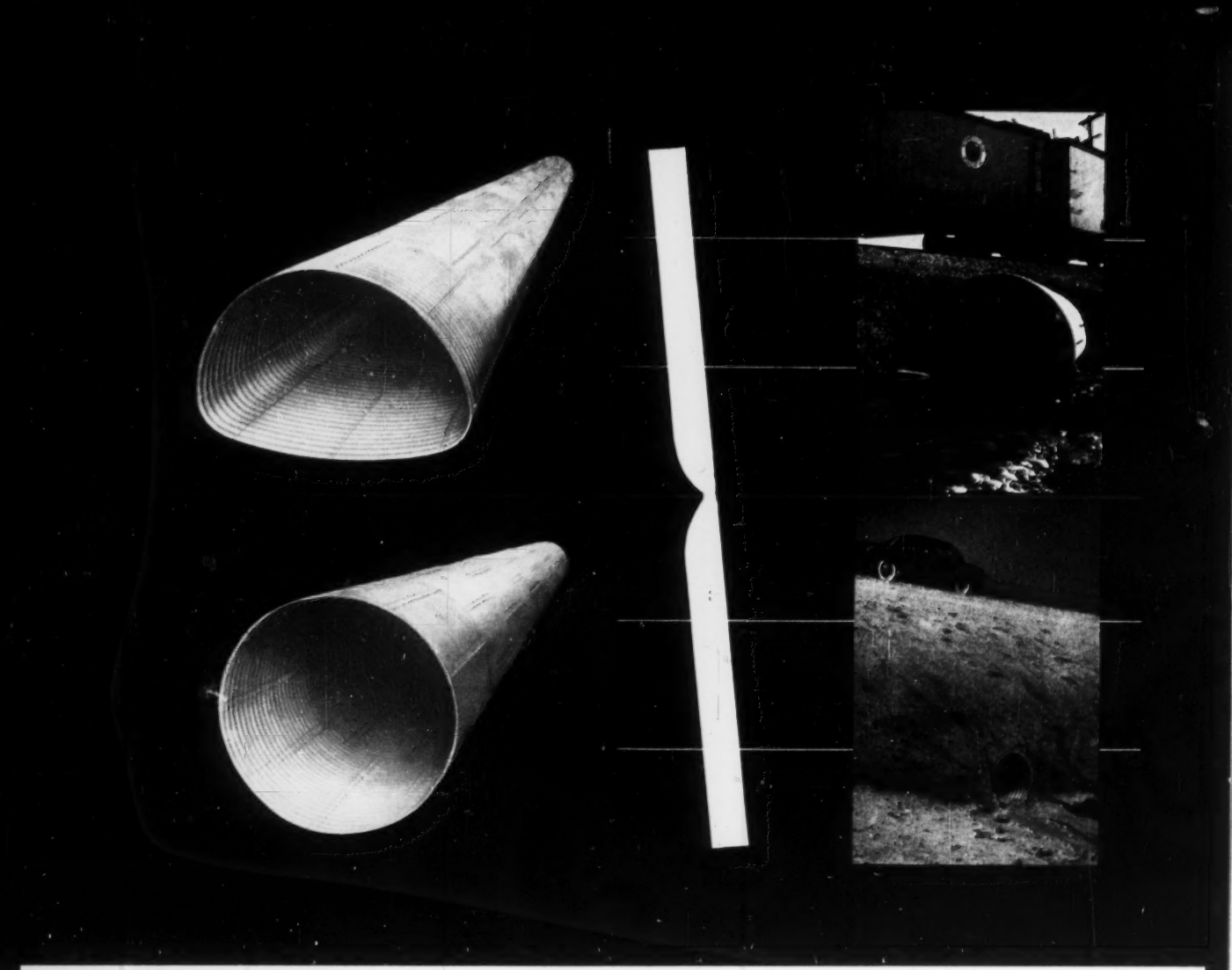


They buried bridges to make them better

Lots of money was spent in building and maintaining railway and highway bridge structures. Then Armco engineers said: "Why not bury your troubles once and for all?"

They developed Armco MULTI-PLATE—a new type of structure that provided adequate waterway area as well as the advantages of building railways and highways on solid ground. Today there are thousands of installations, and earth fills up to 100 feet or more are not uncommon. They will handle any load that can travel the road. What's more, Armco MULTI-PLATE Pipe and Pipe-Arch structures are fireproof and practically maintenance-free.

MULTI-PLATE is shop fabricated and delivered to the job site ready for quick fool-proof installation. Individual plates are nestable—easy to transport and handle. Time and labor savings reach a new high.

Providing better products to meet specific needs has been standard practice at Armco for more than 40 years. A few examples are Spiral Welded Pipe, FLEX-BEAM Guardrail, Steel Buildings and HEL-COR Pipe.

Today you can bring your drainage and construction problems to Armco with full assurance that you will receive all the benefits of long experience, extensive research facilities and a real interest in helping you solve these problems.

Armco has a complete range of engineered products and convenient authoritative data to help you. If your problem is difficult or unusual why not talk it over with us.

ARMCO

ARMCO DRAINAGE & METAL PRODUCTS, INC.

MIDDLETOWN, OHIO • OFFICES AND PLANTS IN PRINCIPAL CITIES
SUBSIDIARY OF ARMCO STEEL CORPORATION

Structural Plate Pipe and Arches ★ Corrugated Metal Pipe ★ Welded Steel Pipe
FLEX-BEAM Guardrail ★ Water Control Gates ★ Retaining Walls ★ STEELOX Buildings
Sheeting ★ Tunnel Liner ★ Subdrainage Pipe ★ End Sections ★ Pipe Piling and Pile Shells

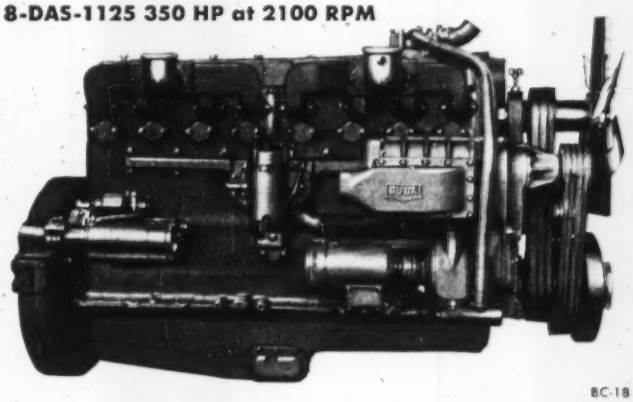
Any way you look at it... IT'S A TOUGH GRADE!

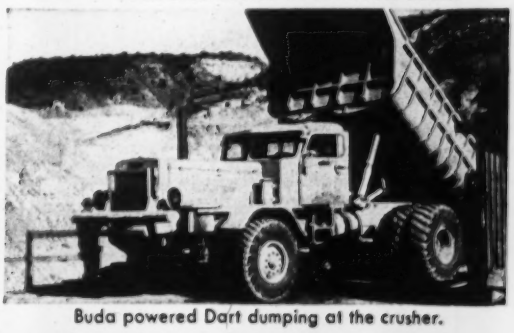
yet BIG BUDA diesels are cutting haulage costs every day!

14 Buda-powered haulage units are roaring up this tough grade . . . 2/10 of a mile with 5 switchback turns . . . hauling payloads up to 22 tons in faster time at a considerable reduction of their former cost.

The extra horsepower and 13 to 25% more displacement . . . greater lugging ability with 9 to 23% more torque of BIG Buda Diesels is paying off at this Bagdad Copper Corp. pit in higher production and lower costs. In many instances, the Budas are going more than 6000 hrs. before overhaul—another factor in lowered costs.

8-DAS-1125 350 HP at 2100 RPM





Buda powered Dart dumping at the crusher.

BC-18

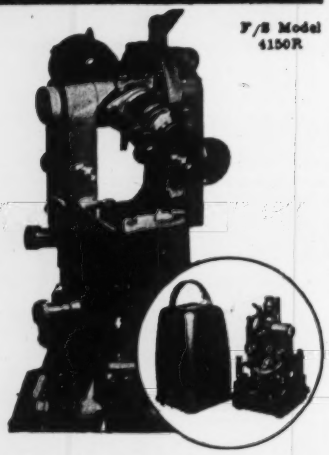
Whatever your power requirements, there's a money-making Buda dyna-swirl Diesel to fit your needs. See your nearby Buda Distributor today. Write for Bulletins and data. *The Buda Company, Harvey, Ill.*

BUDA

Manufacturers of Diesel and Gasoline Engines, Maintenance of Way Products, Lifting Jacks, Earth Drills and Material Handling Equipment

F/S OPTICAL TRANSIT

F/S Model 4150R

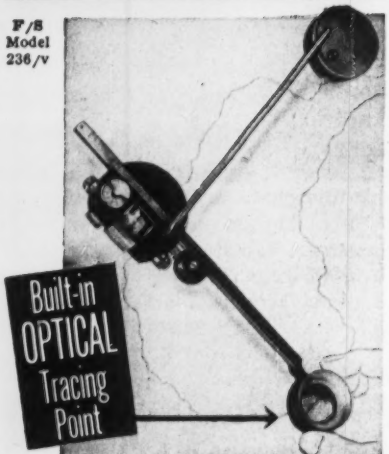


The newest and most modern transit for surveyors and engineers

F/S Model 4150R special features include:
OPTICAL PLUMMET—eliminates plumb bob.
OPTICAL READING SYSTEM—vertical and horizontal readings to 6" at a glance thru reading scope next to telescope.
REPEATING LEVER—speeds repetitions, prevents errors.
FULL "BEHIND INSTRUMENT" OPERATION—no walking around.

F/S Optical Planimeter

F/S Model 236/v



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- New free-wheeling wide angle magnifying lens glides smoothly along outline—no sticking or parallax
- Finger-flick zero-setting control brings both wheels automatically to zero
- Enclosed wheel carriage keeps out dust and maintains high precision

Full Service and Repair Facilities Available
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ENGINEERING NEWS-RECORD

ABP Member

Volume 150 — January 1, 1953 — No. 1

WALDO G. BOWMAN
Editor

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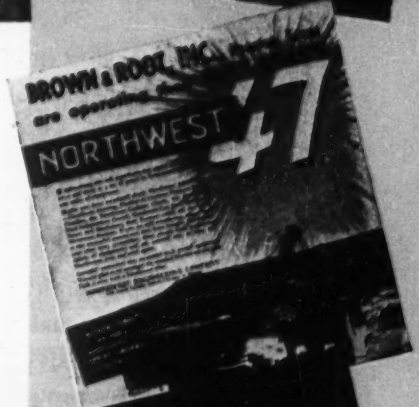
We never get tired of telling you

Advertising can talk superiority but . . . REPEAT ORDERS prove it!



A lot of people have said to us, "Don't you get tired of running those ads with numbers in them, telling about repeat orders, year after year"? Remember this; Advertising can talk superiority but a repeat order proves it. There is no better endorsement of the performance of a piece of equipment. Remember, too, there are a lot of manufacturers that can't do this *month after month and year after year!*

A repeat order tells you better than all the type we could use that what we claim is *so.* It proves that Northwest equipment is *profitable* equipment to own and the fact that we have been able to run this type of advertising for years proves that Northwest has *maintained quality and more than kept abreast of conditions.* That, too, is why one out of every three Northwests sold is a repeat order.

Successful Contractors Stay Successful With Proved Equipment

NORTHWEST ENGINEERING COMPANY
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NORTHWEST

SHOVELS • CRANES • DRAGLINES • PULLSHOVELS

REDUCES

——that's why:

MORE THAN *500 MILLION* POUNDS OF TEXACO MARFAK HAVE BEEN SOLD!

Because it's tougher and does a far better job than ordinary grease, *Texaco Marfak* is easily the world's most famous chassis lubricant. It *stays in* the bearings. Rough service won't pound *Texaco Marfak* out. Heavy loads won't squeeze it out. Thus, you get longer lasting protection against wear, dirt and rust . . . longer life for chassis parts and lower maintenance costs.

In wheel bearings, *Texaco Marfak Heavy Duty* gives similar top protection. It seals out dirt and moisture, seals itself *in* — assuring longer lasting lubrication and greater safety. It needs no seasonal change.

In engines — heavy duty gasoline or Diesel — use *Texaco Ursa Oil X***. It's fully detergent and dispersive, keeps engines clean for lower fuel consumption and maintenance costs. In crawler mechanisms, use *Texaco Track Roll Lubricant* for ideal protection against dirt, water and wear.

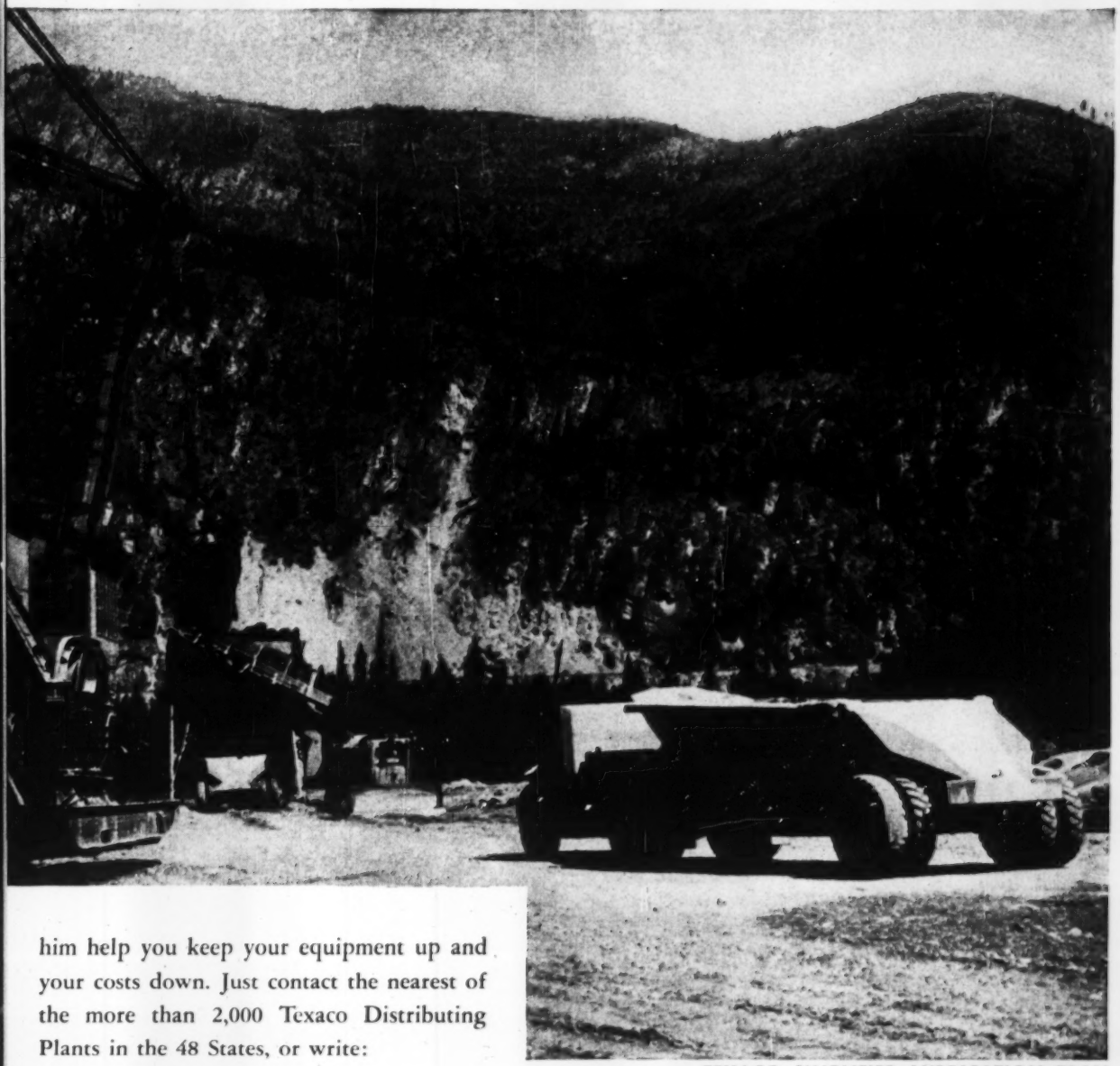
Call in a Texaco Lubrication Engineer. Let

TUNE IN . . . TEXACO STAR THEATER starring MILTON BERLE, on television Tuesday nights. METROPOLITAN OPERA radio broadcasts Saturday afternoons.

TEXACO

TEXACO

MAINTENANCE COSTS



him help you keep your equipment up and your costs down. Just contact the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

☆ ☆ ☆

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO SIMPLIFIED LUBRICATION PLAN helped build Hungry Horse Dam. "The time and confusion saved were incalculable," says contractor. Find out how you can handle all your major lubrication with *not more than six* Texaco Lubricants. Your Texaco Lubrication Engineer will give you all the facts.

Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

For TOUGH jobs with years of work ahead...

MARION 111-M Ward-Leonard Electric shovel owned by the Hydro-Electric Power Commission of Ontario, making a cut for an open canal and recovering aggregate for concrete work.

MARION 111-M
Ward-Leonard Electric

Rock and ore have a way of making things rough for an ordinary shovel.

The machine may win, in the first few months, over the stubborn resistance of shot rock. But it still faces the test of time, for rock and ore "wear down" an ordinary shovel and break its spirit.

It's on the tough jobs, with years of work ahead, that the MARION 111-M Ward-Leonard Electric shovel has a chance to prove its real worth. Today this MARION is winning the battle of the rock pile and the ore pit on many a front.

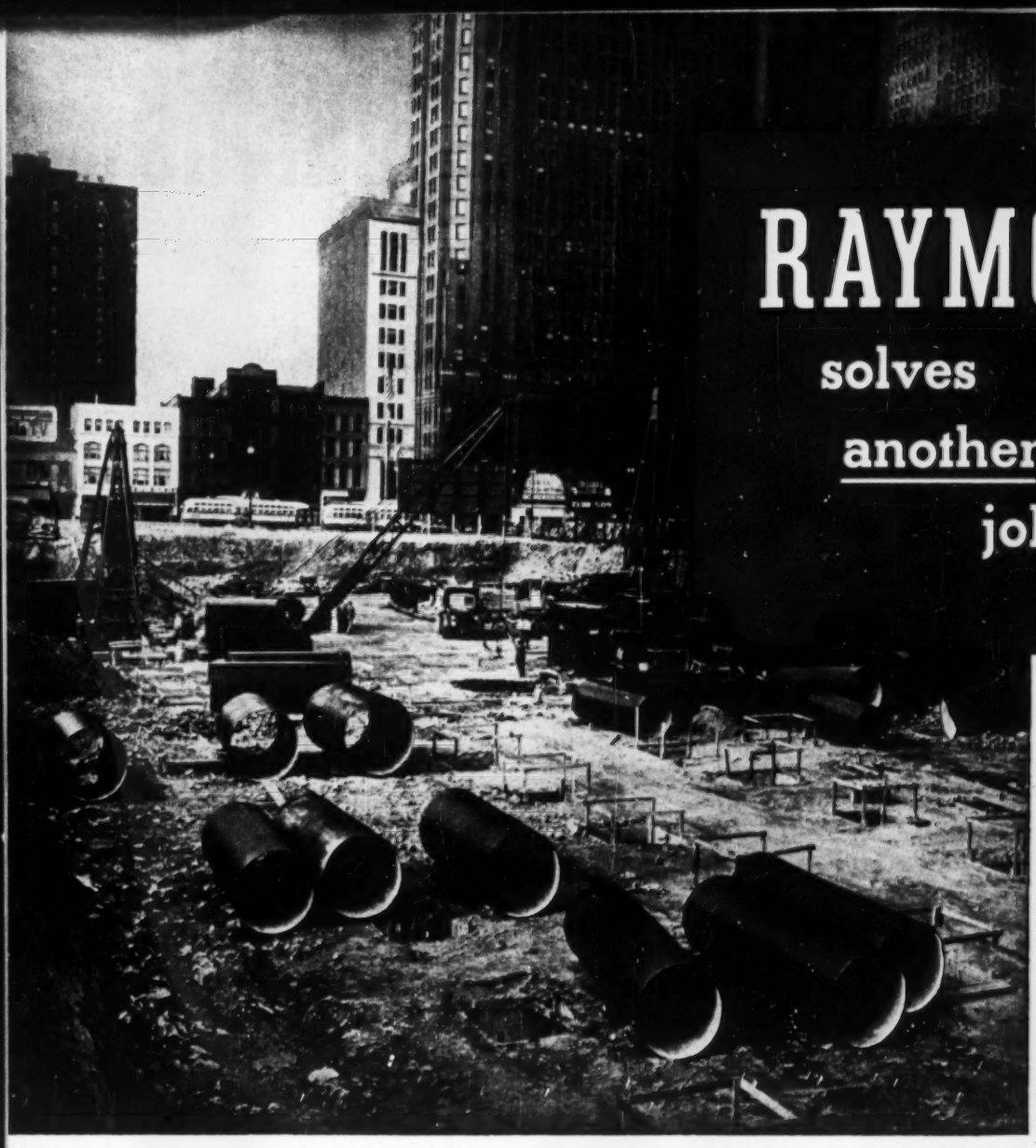
Its victories mean greater production, lower operating cost, less maintenance expense and fewer work stoppages. Its powerful electric muscles and the shock-tested members of its frames and machinery assemblies are making owners say, "This is it!"

It doesn't cost anything to find out what the 111-M Ward-Leonard Electric can do for you. Your nearest MARION office will be glad to give you the facts.

MARION POWER SHOVEL CO.
MARION, OHIO, U. S. A.

from 3/4 cu. yd. to 45 cu. yds.

OFFICES AND WAREHOUSES IN ALL PRINCIPAL CITIES



RAYMOND

solves another tough job!

at left
Sinking Gow caissons for Detroit's City-County Building

FOUNDATION CONTRACTOR:
O. W. Burke Co.

ARCHITECTS & ENGINEERS:
Harley, Ellington & Day, Inc.

CONSTRUCTED FOR:
Detroit-Wayne Joint Building Authority

...To provide the foundation for the City-County Building in Detroit's new Civic Center, Raymond placed 126 Gow caissons, with diameters of 48 to 74 inches, to depths exceeding 100 feet to hardpan. The caissons were belled out on the hardpan to varying diameters. Completion of this project ahead of schedule is another example of how Raymond engineers combine knowledge and experience with specially designed equipment to provide any type foundation anywhere. We would like to serve you on your next project.

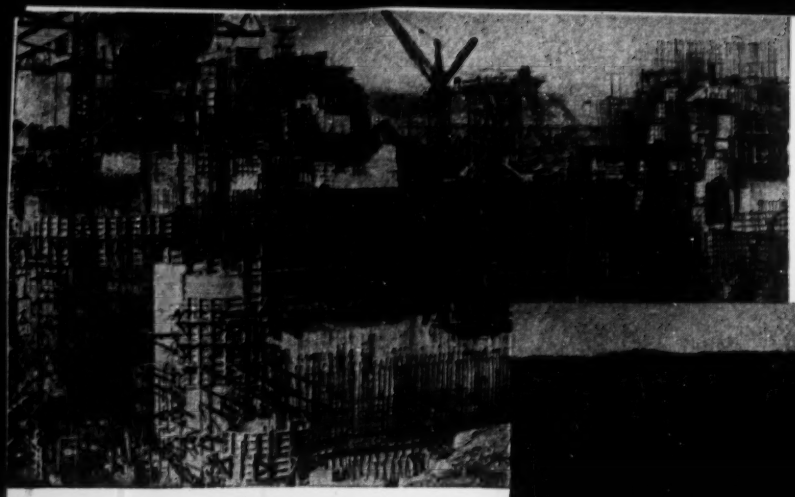
RAYMOND CONCRETE PILE CO.

140 CEDAR STREET • NEW YORK 6, N. Y.

BRANCH OFFICES AROUND THE WORLD IN THE PRINCIPAL CITIES OF UNITED STATES AND CENTRAL AND SOUTH AMERICA

THE SCOPE OF RAYMOND'S ACTIVITIES . . .

Foundation Construction . . . Harbor and Waterfront Improvements . . . Soil Investigations . . . In-Place Pipe Lining . . . Specialized Construction.



Billions of

In the Western world, as autumn came, there was no activity more meaningful or spectacularly visible than along the unruly Rhone River in southeastern France. Working day and night, 16,000 Frenchmen were building 22 dams and hydro-electric plants to harness a vast power potential. When completed, in 1965, the project will:

1. Provide 13 billion kilowatt hours of electrical power per year, more than twice the pre-war level in France, and 3 billion more than America's TVA.
2. Irrigate the arid lower Rhone Valley, raising France's total agricultural yield by 5%.
3. Provide canals and locks to make the river navigable from the Mediterranean Sea all the way to the Lake of Geneva, thus doubling traffic on the present centuries-old 354-mile waterway.

Perhaps the most spectacular unit of the entire program, which already has cost $200,000,000, is the Donzere-Mondragon hydro-electric plant located north of Avignon. When completed in 1953, it alone will provide 2 billion kilowatt hours of power per year. Its construction is on an immense scale. Between 6,000 and 7,000 men are employed here. Two giant concrete dams are being built to divert the river into a cement-lined power-plant canal, 18 miles long and 275 feet wide—75 feet wider than the Suez. The channel from river to canal alone involved moving 650,000 cu. yds. of earth. Handling this entire assignment with 3 LeTourneau rear-dump Tournarockers and a dragline, officials of the Societe de Construction des Batignolles of Paris, contractors in charge, write:

"Our 3 LeTourneau machines hauled 130 cu. yds. of alluvial material per hour—all our dragline could dig from the water. Loads averaged 13 cu. yds. The hauling cycle was 2000 feet, most of it over a narrow strip of land where any other machine of equivalent capacity to the Tournarockers (16 tons) would have found it impossible or, at least, very dangerous to work.

"This last year," they continue, "we ran 2 shifts daily, each shift working 9 hours. The 3 Tournarockers operated 4,000 hours each without having to undergo any repair other than the usual routine daily maintenance. We estimate each machine will stand the strain of another 2,000 hours of similar work before having to undergo a general overhauling."

The rugged construction, high-working speeds and unusual maneuverability of these modern earthmovers are important factors in increasing production and lowering costs on the Donzere-Mondragon Canal. Your LeTourneau Distributor can explain how electric-control Tournarockers can simplify and speed work on *your* projects. There is a size to fit your needs—9, 18, 35, and 50 tons.

LET
HIGH-SPEED, RUBBER-TIRED EXCAVATING • HAULING • LIFTING EQUIPMENT

kilowatts of power for *France*

With 4-wheel, multi-disc air brakes and instant electric power steer, Tournarockers haul along narrow roads in complete safety. Operators handled these electric-control units with top efficiency after less than a week of training.

Tournarocker is loaded with 13 cubic yards of alluvial earth. Material, being dug to open a channel between the river and the canal, is used to buttress the concrete dam.

Tournarocker—Trademark Reg. U.S.Pat.Off. R-220-D

R. G. LeTOURNEAU, INC., *Peoria, Illinois*

THE VICTAULIC® METHOD OF PIPING

EASIEST WAY TO MAKE ENDS MEET

TEES . . . ELBOWS . . . REDUCERS . . . the Victaulic Method features a complete line of modern, top efficiency, Full-Flow Fittings for use with world famous Victaulic Couplings!

The Victaulic Method assures a complete, modern system of piping . . . fast, efficient hook-ups that simplify and streamline construction . . . cut costs! Victaulic Couplings offer easy-to-install, leak-proof connections . . . a union at every joint . . . assured trouble-free service under pressure or vacuum. Victaulic Full-Flow Fittings specially designed for use with Victaulic Couplings provide wide adaptability and complete versatility in construction. And to make the Victaulic Method complete—"Vic-Groover" Tools groove standard pipe easily and quickly . . . provide handy, portable equipment for preparing pipe right on the job!

Try the VICTAULIC METHOD on your next piping job. New construction . . . repairs . . . alterations—you'll find that the Victaulic Method *is the easiest way to make ends meet!*

Write today for Victaulic Catalog and Engineering Manual No. 44-8D.

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READER COMMENT

Arch vs viaduct

Sir: I read with interest the description of the "Spectacular Venezuelan Concrete Arch Bridge," in your issue of Sept. 11, p. 28. The constructors are certainly to be congratulated on the successful outcome of this feat, but we have in England a phrase, "Was your journey really necessary?"

It would appear from the description that the gorge was not a deep, fast-moving river requiring a large-span bridge. Indeed, if it had been, the method of construction would not have been so usable.

It is difficult to see why a straightforward viaduct was not built. Its maximum height would have been only just over 200 ft, with an average of about 100 ft, and, on the face of it, its cost would have been about one-third. Furthermore, a well designed viaduct would be more difficult to destroy in toto by aerial attacks, which is a consideration these days.

Skill and hazards are only exemplified to the advantage of humanity when conserved for essential uses.

E. Owen Williams
Sir E. Owen Williams & Partners
London, England

Sir: In reply to Owen Williams' comments on the design of the three bridges being built under my direction on the new Caracas-La Guaira highway, I call attention to the following all-important facts:

1. Investigation of our design by the client, and careful analysis of our price for these three bridges, revealed that among the several proposals offered we presented the most advantageous solution from the point of view of engineering and economics.

2. Mr. Freyssinet is not one to overlook an alternative design permitting a two-thirds saving in the price of the job. If this were so, the Empresas Campenon Bernard would not be in business in Venezuela today.

3. The architectural beauty of the structure was to be blended into the superb scenery of the new highway, which links a modern, prosperous metropolis with its only air and seaports. It is not a link between two jungle outposts.

4. The cost comparison between the proposed "straightforward" viaduct and that of the pleasing structure of Mr. Freyssinet, designed to span some 500 ft at an elevation of 220 ft favors the arch:

(a) The viaduct might require

(Continued on page 13)

Amsco Chains Get Tougher With Use

How AMSCO Manganese Steel Chains Acquire Progressively Greater Resistance to Impact and Abrasion.

Actual case histories prove that AMSCO Manganese Chains outlast ordinary chains by more than 6 to 1 where impact and abrasion exist. For example, on one conveyor operation, ordinary chain had to be completely replaced every three months. When AMSCO Manganese Steel Chain was installed, only a small fraction of the links were replaced during a test period of over 24 months.

Users of AMSCO Chains benefit by unusual freedom from expensive chain replacement, breakage, maintenance-down-time and other problems caused by impact and abrasion conditions.

AMSCO Manganese Steel Chains have the unique ability to work-harden with use. In rough service, they develop a surface hardness up to 500 Brinell. They also acquire a hard glass-like polish that helps shrug off grinding abrasion. All AMSCO Manganese Steel products — tough when produced — possess the extra-value quality of actually increasing durability with in-use battering and grinding.

AMSCO Chains are made of Manganese Steel —the "Toughest Steel Known." They are produced in many standard and special shapes by American Manganese Steel Division—largest producer of manganese steel for all industry.

If you use chain, and desire a more durable alloy, you are invited to contact AMSCO. There's a good chance we can save you money and provide chains that will outlast your service life expectations.

Drag Line Type Chain—Mining & Excavating

AMSCO Chain Assumes Many Forms To Serve Industry. A Few Are:

Detachable Chain—Bucket Elevating

Pinlock Type with Cast-on Dog—Log Hauling

840 Series Chain—Bucket Elevating

Rivetless Chain—Mining

Clinker Drag Chain—Cement Milling

AMERICAN Brake Shoe COMPANY

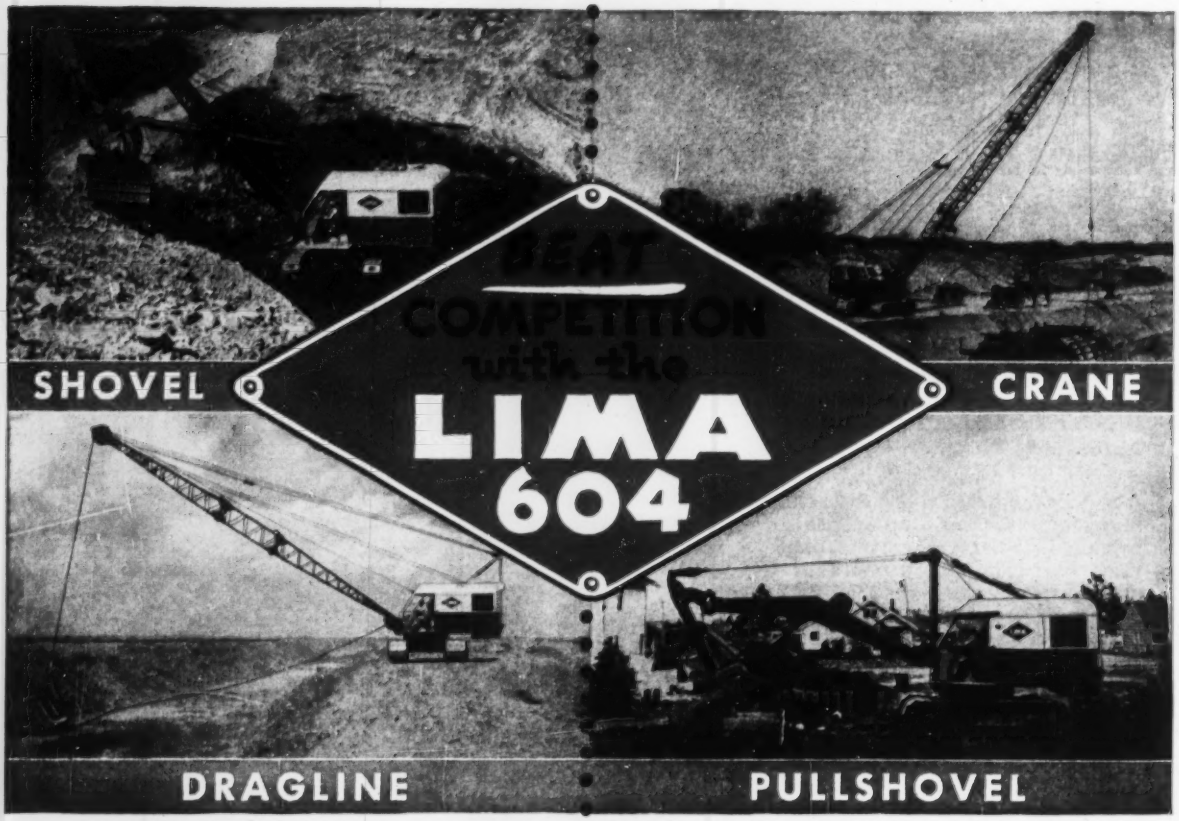
AMERICAN MANGANESE STEEL DIVISION

379 EAST 14th STREET • CHICAGO HEIGHTS, ILL.

Other Plants: New Castle, Del., Denver, Oakland, Cal., Los Angeles, St. Louis. In Canada: Joliette Steel Division, Joliette, Que. Amsco Welding Products distributed in Canada by Canadian Liquid Air Co., Ltd.

LIMA

Wheel or truck mounting is available on machines of ¾ and 1½ yards capacity.



THE ALL PURPOSE MACHINE

Here are four typical examples of the versatility of the LIMA Type 604. Realizing that most contractors bid various types of work, LIMA has gone to great lengths to make a machine that is easily converted in the field to shovel, crane, dragline or pullshovel, thus giving the owner the advantage of four machines in one.

Versatility is but one of the many advantages that make the Type 604 a leader in its class. For instance, air controlled clutches do all the work—with one slight touch of the levers, the hoist, crowd, travel and swing clutches can be engaged or disengaged, making for ease of operation. Anti-friction bearings in the drums and other important bearing points reduce destructive friction and lessens lubrication problems. Simplicity of design results in fewer working parts and greater safety for the operator.

For further information on the Type 604, write your nearest LIMA distributor or write to Baldwin - Lima - Hamilton Corporation Construction Equipment Division, Lima, Ohio, U. S. A.

CAPACITIES: Shovels ¾ to 6 cu. yds. Cranes to 110 tons. Draglines, variable.

OFFICES IN PRINCIPAL CITIES OF THE WORLD

BALDWIN-LIMA-HAMILTON

BALDWIN BLH LIMA-HAMILTON

SHOVELS • CRANES • DRAGLINES • PULLSHOVELS • TRUCK CRANES
CRUSHING • WASHING AND SCREENING EQUIPMENT

three piers of 220-ft height, with foundations of 60-ft depth, permitting deck girders of at least 125-ft spans. The cost of such beams, cast in place at some 220 ft above ground level, with the erection of appropriate falsework, works out at about 2½ to 3 times the cost we have found in the Freyssinet design. Mr. Freyssinet's solution, consisting of a deck made up of 40 to 48-ft long continuous, prefabricated beams, erected by gantry without falsework, cost only about $255,000. Therefore, in the deck alone we brought about a saving of some $400,000 to $500,000 over the conventional viaduct proposed.

(b) Mr. Freyssinet's three arch ribs and spandrel columns cost about $560,000, which is roughly the amount we saved in the deck over the proposed solution; therefore, if we assume that the construction of three 220-ft high, 70 to 80-ft wide piers, and their 60-ft foundations cost approximately the same as our arch ribs and spandrel columns, the work is still $400,000 to $500,000 less expensive than the "straight-forward" viaduct.

Space does not permit a more exhaustive reply, but consideration of these facts alone would appear to cast a better light upon Mr. Freyssinet's genius and the wisdom of our client.

R. SHAMA
Managing Director
Empresas Campenon Bernard
Caracas, Venezuela

Sidelight on Bolivian road

Sir: I found the article on the "Vital Bolivian Road" in your October 2, 1952, issue very interesting. That road has an unforgettable spot in my memory—I have walked the line that the road is being built on at least twice and have ridden a mule over all of it.

I was in charge of the field parties when we laid it out. Ben Cottrell, of U. S. Bureau of Public Roads, Washington, D. C., was in charge of the work. We had as many as 300 Bolivians working on the survey and the final staking of a center line for the contractor. The men were divided into groups of 30 to 40 with camps scattered along the route. Some of the line was accessible by car, but most had to be reached by foot or by mule. Many of the camps were supplied by mule train.

I spent about 18 months with these crews and they were rather tough months. R. A. Stephenson, who is now bridge engineer with the U. S. Bureau of Public Roads, Missoula,

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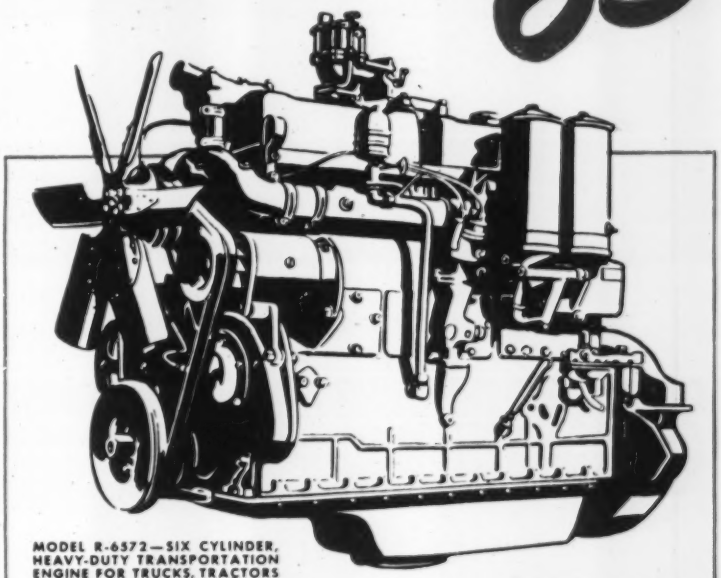

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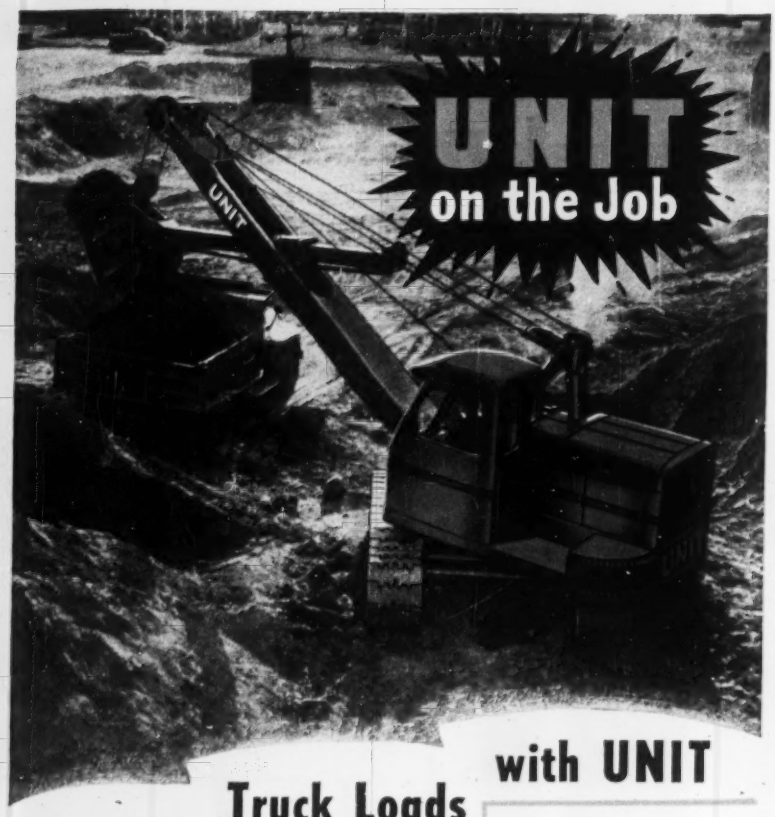

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READER COMMENT

Montana, was bridge engineer on this road and spent some time in the field with me checking bridge locations, sizes, and a line for the road. We also ran a drainage survey, measuring up all the drainage over the entire 300 miles.

There was a total of about 6 Americans assigned to the job at one time, all on loan from the U. S. Bureau of Public Roads.

EARL K. MCNEIL
Civil Engineer
Chicago, Ill.

CALENDAR

National Constructors Assn., Hotel Commodore, N. Y. City, Jan. 13-15.

Highway Research Board, annual meeting, National Research Council Bldg., Washington, D. C., Jan. 14-16.

American Society of Photogrammetry, annual meeting, Shoreham Hotel, Washington, D. C., Jan. 14-16.

National Association of Home Builders, Conrad Hilton Hotel, Chicago, Ill., Jan. 18-22.

American Society of Landscape Architects, annual meeting, Ansley Hotel, Atlanta, Ga., Jan. 26-28.

Association of Asphalt Paving Technologists, Rice Hotel, Houston, Tex., Jan. 26-28.

Associated Equipment Distributors, annual convention, Conrad Hilton Hotel, Chicago, Ill., Feb. 1-5.

Mason Contractors Association of America, Sherman Hotel, Chicago, Ill., Feb. 1-4.

California Street and Highway Conference, University of California, Berkeley, Feb. 4-6.

American Road Builders Association, Hotel Statler, Boston, Mass., Feb. 9-11.

American Concrete Institute, annual convention, Statler Hotel, Boston, Mass., Feb. 17-19.

Interamerican Congress of Municipalities, Montevideo, Uruguay, Feb. 20-28.

Ohio Water Clinic, Ohio State University, Columbus, Feb. 19-20.

Illinois Conference on Highway Engineering, Urbana, Feb. 24-26.

Industry conference on air pollution abatement, Hotel Statler, Detroit, Mich., Feb. 26-27.

American Concrete Pipe Association, annual convention, Baker Hotel, Dallas, Tex., Feb. 26-28.

American Concrete Pressure Pipe Assn., annual convention, Baker Hotel, Dallas, Tex., Feb. 25.

American Concrete Agricultural Pipe Assn., annual convention, Baker Hotel, Dallas, Tex., Feb. 26.

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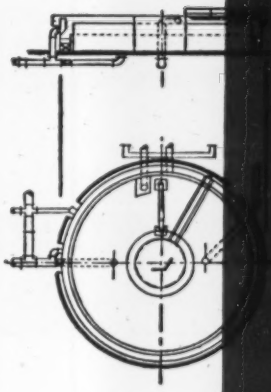
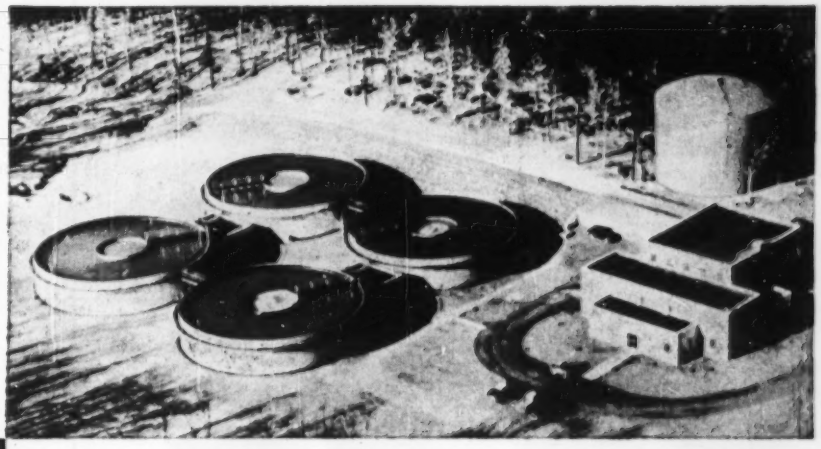
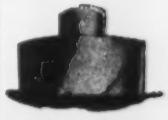




Illustrated is first Aldrich installation at Alexandria, Va., with capacity of 9 mgd.

Each unit of the Aldrich purification system built to date, is an independent mixing, settling and filter plant of 2.5 mgd. capacity. The annular filter bed circling the periphery of each unit is 3 feet wide; water depth is 15 feet in all compartments; the annular settling compartment is 76 feet in diameter; the mixing tank is 24 feet in diameter.



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Favorable signs for business in 1953

Business is getting a fast send-off into the new year. Construction is humming, and industrial production has been setting new peacetime records every month. While there have been indications that the recent comfortable volume of business won't last forever (Trend, Nov. 20, '52) there also has been a rash of signs indicating that 1953 will be another good year for most of U. S. business. Here is a rundown of some of the good signs.

Business plans to invest heavily in new plant and equipment this year. A survey by the Department of Commerce, just released, confirms earlier findings by McGraw-Hill that business intends to spend almost as much for new plant and equipment as it did in record 1952.

Industrial construction still will be down substantially in 1953, despite these plans—since many companies are winding up the building stage of their current expansion programs. But heavy capital spending is nevertheless good for construction. It includes more building for utilities and commercial organizations. And it means continued high incomes for millions of workers in capital goods industries, and this contributes indirectly to demand for housing and other types of buildings.

The year also ended with a record burst of consumer buying. Retail sales in the last quarter of 1952 were about 7% higher than in the same quarter of 1951. All the evidence indicates that this has not been just scare buying; it's right in line with the level of sales that could be expected normally at present levels of consumer income.

Retail sales—like sales of industrial equipment—don't add directly to demand for construction. But they do contribute indirectly. If sales hold up—and it looks now as if they will—builders will be encouraged to go on planning increased construction of commercial buildings, from garages to big suburban shopping centers. Commercial building can be a major offset for the expected decline in industrial construction.

Home building was more active all through the fall than it had been since early 1951. As a result, housing starts in 1952 reached the second highest total on record, behind only 1950. Most observers seem to agree that the outlook for home building in 1953 is good; there will be plenty of mortgage money, and starts may reach one million for the fifth year in a row.

• **Optimism factor**—Business men as a group are optimistic. It is easy to see why—sales high, production high and rising, and a Republican administration heading into Washington.

Optimism cannot, of course, make good business by itself. But it can lead to more contracts for new construction, higher orders for new equipment and other goods, and thus contribute to sustained prosperity.

Construction itself is showing signs of continued strength. The record volume of contracts let in 1952—ENR added up $15.7 billion—and the high rate at the end point to another great year for heavy construction. Forecasts of construction-put-in-place for 1953 generally indicate a volume equaling or exceeding that for 1952.

• **Expert opinion**—Finally: Studies of the business outlook now being made in Washington are full of optimism—not just for 1953, but for later years as well. The forecasters don't rule out the possibility of trouble; in fact, they expect trouble. But the general view is that the period ahead, on balance, will be a bright one for U. S. business. And these forecasts are based on studies by real experts—not just politicians.

All these signs don't prove that business will be good for everyone this year. Some industries—steel, some non-ferrous metals, appliances, textiles, among others—are pretty sure to suffer letdowns some time in 1953. And others may run into trouble toward the end of the year.

But the signs are encouraging, nevertheless. They add up to a fast start for '53, and a chance for continuing good business later in the year.

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THE CONSTRUCTION WEEK

• **Nobody's happy**—Last week's report of the National Security Resources Board—which goes along pretty well with recommendations of the Paley Commission (ENR June 26, 1952, p. 80)—carries in its 100-odd pages some strong disagreements by government construction agencies with Paley comments.

For instance: Paley's group attacked what it called waste of materials by building codes and industry practices—but all agencies are strongly opposed to the suggestion that FHA insurance and other aids should be tied to adherence to "national minimum requirements" for building, to be drawn up by HHFA. Most believe that any such code should be drawn up both by government and private interests—and aren't too sure it could be enforced.

Whole report will get new going-over, anyway, by an Eisenhower-endorsed group of private interests (the Citizens' Conference on the Conservation and Development of Natural Resources) next March.

• **One more shot**—The old Congress wasn't quite through yet. This week the Defense Department's $9-billion base construction program met Congressman Porter Hardy's House Subcommittee on Government Operations, which said:

Buildings are too deluxe and costly; specifications are overwritten, resulting in early obsolescence; there is too wide a range of unit costs for like buildings in like climates for the three armed services; there's been failure to discriminate between what's needed now, and what may be desirable later.

Construction men said this much is obvious from the report: It furnishes added talking points for congressmen aiming at trimming the $3-billion military budget—but there still won't be any sizeable reduction in overall expenditures for new military public works; maybe more for the dollar spent.

• **Success story**—One of the biggest factors behind the current nation-wide push for construction of toll highways was easily apparent this week.

The New Jersey Turnpike Authority happily reported a phenomenal success for the first 12 months: Revenues totaling $16.8 million from all sources; a net of just short of $15 million after operating expenses; a profit of nearly $4 million after payment of interest.

• **No entertainment troubles**—Builders of recreational, amusement and entertainment structures—counted upon heavily to bulk up construction business in 1953—won't have much trouble finding materials, NPA was saying.

Said John L. Haynes, director of NPA's Building Materials Division: Requirements for this type of construction can be met without interfering with supplies for the great volume of other types of construction activity estimated for 1953. Haynes expects recreational building to top $250 million for '53.

• **Cancel one**—The byplay that centered around Lloyd A. Mashburn, California State Labor Commissioner, and the U. S. Labor Department post he didn't get, was interesting to construction men.

A former lathers' union official, he let it be known that the job of Undersecretary of Labor had been offered to him by Plumber Martin Durkin—Labor Secretary-designate. Durkin immediately denied any such offer, added that such appointments would have to be made by President-elect Eisenhower, whose office said flatly that no such appointment had been tendered.

• **No, thanks**—Canada isn't having any private assistance in building the St. Lawrence River project—it wants either a U. S. public agency, or will go along alone.

So said the Canadian Department of Justice to the U. S. Federal Power Commission last week, in answer to an application from the Public Power and Water Corp., a New Jersey (Trenton) private group, which had announced publicly that it would be glad to build the U. S. half of the St. Lawrence power facilities.

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On this continuous pour job, Superintendent Phil North found that Duraplastic's outstanding uniformity and plasticity permitted moving the forms "at even speed . . . and quicker." That's why he says it resulted in "decided savings for us."

His experience is typical. When you use Duraplastic air-entraining portland cement, less mixing water is required for a given slump. It makes concrete more plastic, more cohesive, more uniform. And the increased plasticity aids proper placement with improved surface appearance.

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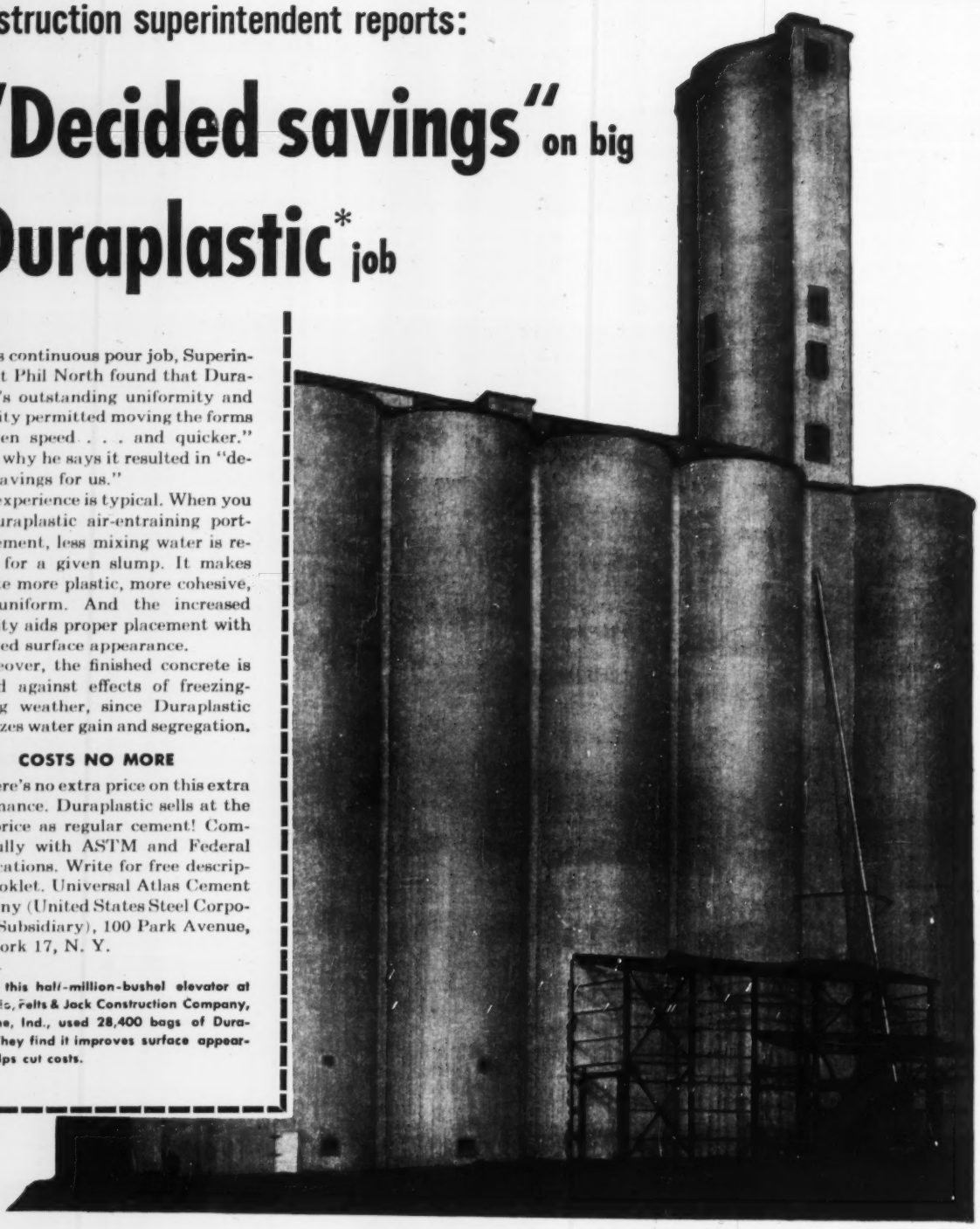
Yet there's no extra price on this extra performance. Duraplastic sells at the same price as regular cement! Complies fully with ASTM and Federal Specifications. Write for free descriptive booklet. Universal Atlas Cement Company (United States Steel Corporation Subsidiary), 100 Park Avenue, New York 17, N. Y.

To build this half-million-bushel elevator at Lima, Ohio, Felts & Jack Construction Company, Ft. Wayne, Ind., used 28,400 bags of Duraplastic. They find it improves surface appearance, helps cut costs.



*"Duraplastic" is the registered trade mark of the air-entraining portland cement manufactured by Universal Atlas Cement Company.

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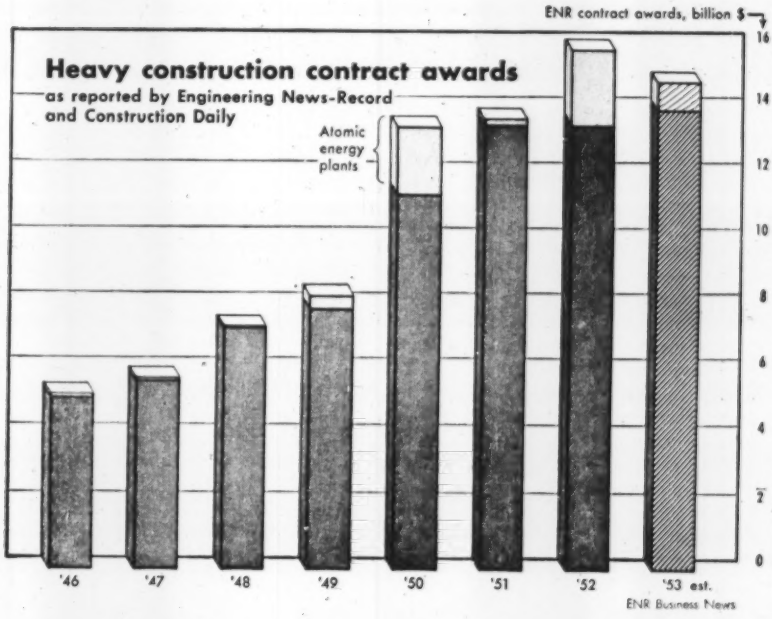


Another record year

• $15.7 billion in contracts shows 15% jump over '51
• Atomic Energy Commission biggest construction buyer

The curtain has come down on the biggest year—in dollar volume—the construction industry has ever had.

During 1952, new construction contracts reported by ENGINEERING NEWS-RECORD and the Construction Daily, shot up to $15.7 billion, a 15% jump over the previous record of $13.6 billion, in 1951.

Atomic energy plants, highway and bridge construction, and private mass housing rolled up the largest gains during the year. All of these—except private housing—established new records in dollar volume.

Just 10 years after the first successful chain reaction in nuclear fission took place in this country, in 1952, the Atomic Energy Commission became the largest single buyer of construction in the U. S.

Atomic energy plants piled up new contracts for a $2.3-billion total that set a new record. AEC's new plant at Portsmouth, Ohio, accounted for the biggest share with $1.2 billion, but a $464-million atomic diffusion plant at Oak Ridge, Tenn., and a $459-million addition to the Paducah, Ky., plant also were substantial contributions.

Highway construction awards reached an all-time high of $1.4 billion in 1952. Contracts were 20% ahead of 1951, and 10% above the previous record, set in 1950. The highway award pattern followed ENGINEERING NEWS-RECORD's earlier estimates (ENR Mar. 20, 1952, p. 31).

Bridge construction showed even greater gains, with $414 million in awards, 31% above 1951, and 12% higher than the old record posted in 1950.

Waterworks contractors closed the books on a record year for new business, posting a total of $231 million in new contracts. That was 11% ahead of 1951, and 7% ahead of 1950, the previous record year.

Private mass housing came surprisingly close to setting a new high in '52, with contracts totaling $3 billion, 49% above 1951 and only 4% under 1950's all-time peak. Private housing awards were still running strong as the year ended.

Commercial building, which suffered the most from controls, won some relief from Washington. Easing of controls, and a better supply of steel, brought a healthy surge in contract awards for stores, office buildings and shopping centers in the second half of the year.

With a large part of the defense build-up nearing completion and the government's fast tax amortization program losing steam, private industrial awards fell off to $2.7 billion. That was down 34% from the all-time high of $4.1 billion in contracts awarded in 1951.

New contracts for industrial building fell sharply in the third quarter. But volume stepped up in the final three months of the year with a total of $720 million in new awards, compared with $504 million in the third quarter.

The process industries, including chemicals and aluminum, and public utilities, continued to set the pace in industrial building. New chemical plant construction ran less than 15% behind the record expansion piled up in 1951.

Public buildings, excluding AEC and public housing, had another big year in '52. Total contracts came to almost $2 billion, and were nearly 2% ahead of 1951. Of that, more than

Basis for figures

ENR statistics for contract awards for heavy construction cover projects reported in Engineering News-Record and the Construction Daily. These are screened at the following minimum values: Waterworks and waterways, $34,000; other public works, $60,000; industrial buildings, $82,000; and other buildings, $300,000.

These reported contract award figures differ from estimated expenditures for construction put in place, which include estimates of construction that falls below the ENR minimum dollar value of projects reported.

ENGINEERING NEWS-RECORD is a consolidation of Engineering News and Engineering Record, effected in 1917. The Contractor was consolidated with Engineering News Record in 1918. Engineering News was founded in 1874 as The Engineer and Surveyor, which title subsequently became The Engineer, Architect and Surveyor, Engineering News and American Railway Journal, and finally Engineering News. Engineering Record was established in 1877, as the Plumber and Sanitary Engineer. Subsequently it became The Sanitary Engineer, Engineering and Building Record, and, finally, Engineering Record. All rights to the above titles are reserved.

$1.1 billion was for state and municipal projects. Federal projects, including military and naval buildings, had more than $800 million in contracts for an 18% gain over 1951. The total included a large volume of ordnance plants.

Earthwork and waterways lost a little ground, ending 1952 about 20% under '51. Sewerage works finished up the year 9% below 1951. Public housing awards showed a drop of 6% for the year.

Contracts for public unclassified construction, mainly federal airport work, fell off 10% in '52. A drop in the volume of contracts for new airstrips was largely responsible for the decline in the total. However, hangar and shop construction at federal airports increased in 1952.

Private unclassified construction dropped 21%. The sharp decline in pipeline contracts was an important factor. Railroad construction contracts were also down. Transmission lines picked up more contracts in '52 than in '51—the only category in the private unclassified area that showed a gain.

Construction will be good in 1953

Construction business will continue at a boom level in 1953. Discounting atomic energy construction, which is not likely to repeat its $2.3-billion 1952 performance, the construction outlook for '53 is good. Every major type of construction—except AEC and industrial building—is expected either to match 1952, or to go beyond it for new records. ENGINEERING NEWS-RECORD estimates that 1953 contract volume will be close to $14.8 billion.

The optimistic outlook is based on a continued rise in several types of construction, offsetting, in large part, declines expected in other types.

Highway awards can be expected to set a new record in '53. The outlook is for a 25% boost over 1952. That would mean awards totaling $1.7 billion. Bridge awards will also set a record with a total of about $500 million expected, 21% over '52.

New sewerage work will be awarded at a faster rate in '53 than in '52. Awards should total $350 million, up 15% over 1952

Public buildings, other than atomic energy plants and public housing, will move along at a fast clip in '53, with schools and hospitals leading the way. This category should be up about 7%, with awards totaling $2.1 billion in 1953.

Public housing awards will total about $500 million, down 17% from 1952. Earthwork and waterways, with 1953 awards of about $450 million, will be down 9%. Waterworks will stay close to the '52 level of $231 million.

In the private field, commercial building will be the sparkplug in '53, with awards expected to reach $1.1 billion, 30% over 1952. Private mass housing will continue at its present rate, finish 1953 with about a $3-billion contract total.

Industrial building may drop—but not much. Awards in this category will run about $2.5 billion, down 8% from 1952. Because of the large pipeline program, private unclassified construction should have a big year.

Industrial construction to feel new surge

There will be plenty of industrial expansion in 1953—enough to keep the construction industry busy putting up plants all year. And the way business is running now, construction of factories, housing, hospitals, etc., will remain big beyond the defense mobilization period.

The Securities and Exchange Committee and the Department of Commerce have brought out a year-end survey of industrial intentions for capital expansion in 1953. Commerce has an estimate of how prosperous the economy will be in 1955.

The tables below give the short-term and long-term prospects for construction.

On 1953 capital expansion, you have to keep in mind that equipment looms larger in the totals than brick and mortar do. But still about $26.3 billion is the total for 1953, and construction will get a healthy share.

And in 1955, if the country stays as prosperous as it is now, you can get your share of $9 billion in new-plant building, $11 billion in housing, $2 billion in institutional construction, and $2 billion in farm building.

The composition of the estimated $26.3 billion to be spent in '53 will change from that of the $26.9 billion spent in 1952 and $26.3 billion in 1951.

Some industries that have had both defense and civilian expansion the last couple of years will continue to expand—notably electrical and non-electrical machinery, petroleum, rubber, and public utilities. On the other hand, iron and steel, nonferrous metals, and transportation equipment industries will decline in 1953.

Here are the estimated expenditures on new plant and equipment by U. S. business, 1952-53:

	1952	1953	% chg 1952-53
	($ million)		
Manufacturing	12,452	11,907	—4
Durable goods industries	5,869	5,326	—9
Nondurable goods industries	6,583	6,582	0
Mine	850	871	+2
Railroad	1,398	1,120	—20
Transportation, other than rail	1,394	1,384	—1
Public utilities	3,961	4,017	+1
Commercial and other	6,804	6,972	+2
Total	26,860	26,271	—2

SOURCE: Sec. Dept. Commerce.

• **Watch oil**—Manufacturers' plans for outlays in 1953 will amount to $11.9 billion, or 4% below 1952. Record expenditures are expected by petroleum companies, $2.7 billion in 1953, compared with $2.5 billion in 1952. Iron and steel company spending of $1.4 billion in 1953 is a reduction from the peak 1952 expansion. Chemical companies are planning expansion programs of $1.4 billion in 1953, about the same as in 1952.

Public utilities plan to spend about $4 billion in 1953, with the expansion by electric power companies almost offset by declines in the gas industry. Mining companies also expect a moderate increase in capital outlays in 1953. Commercial and other industries, which, because of restrictions and reduced materials allocations, cut back their outlays from $7.5 billion in 1951 to $6.8 billion in 1952, plan an increase to $7 billion in 1953.

• **Forecast for 1955**—The Commerce Department's post-mobilization study shows that construction in 1955 should be about as good as it has been in the last year or so. However,

the Commerce economists point to 1955 as the critical year for any real downturn in the economy.

They say: "Particularly, this is so since the reduction would be almost entirely in government purchases from the durable goods and construction industries, which may also be experiencing slackening demand in the private investment field unless that adjustment is completed earlier."

The amount spent on new residential construction in 1951-1952 was $11 billion. Growth in the number of households is important in the demand for homes. The Bureau of the Census figures that family formations will average around 750,000 a year between now and 1955—so you can figure that after next year, 750,000 will be the goal for homebuilders. (Earlier estimates figure that 1953 will be another 1,000,000 unit year.)

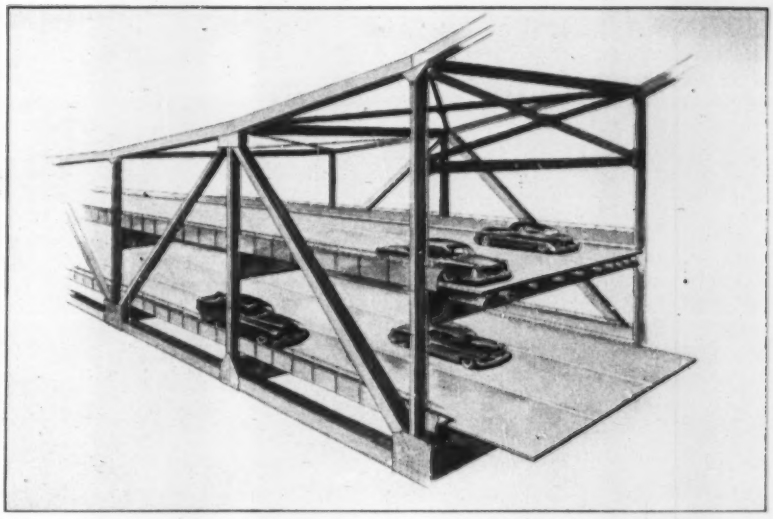
A good market is in hospitals. The Commerce study says a substantial volume is needed to bring hospital capacity up to standard. Large programs for highways of all types are needed in order to restore the road system and take care of increased usage by cars and trucks. The outlook is for increase in expenditure in both these fields.

• **The future**—The big markets for industrial construction in the future include atomic energy, electric power, chemicals, chemical fibers, and air transportation. For each of these industries, the Commerce report details the rapid expansion that has occurred since the end of the war, and the reasons why the economists expect the sharp upward curves to continue.

The Commerce report on the "markets after the defense expansion" was embarked on last fall as an updating of the department's valuable study of post-war markets that came out just as the Allies were winning World War II. Then, the economists showed that demand for housing, and for plants to make consumer goods would maintain a prosperity. Now the department people say the same thing for the period after the defense build-up. For full report write Supt. of Documents, Washington 25, D. C. for 55 cents.

Here are estimates of expenditures for construction in 1955, after the defense build-up has been reached, as calculated by the Dept. of Commerce in its report, "Markets After the Defense Expansion":

	1951	$-billions 1955 (Est)
Investment in new plant	8.8	9
Residential	11.0	11
Institutional	1.7	2
Farm construction	1.8	2



Bay Bridge bids in, bonds may snag

Although bids were received Dec. 19 on phases of the construction of the Richmond-San Rafael Bridge across the north arm of San Francisco Bay, actual work may be delayed by court action. A California superior court has been considering an injunction action brought by advocates of an earth dam across the bay, and, if granted, the injunction would halt sale of $62 million in revenue bonds to finance the project.

In the late December bidding, the low bidder for the bridge substructure was a combination of Ben C. Gerwick, Inc., of San Francisco and Kiewit with a total of $14,234,550. Next low was a combination of several large firms headed by Raymond Concrete Pile Co. and J. H. Pomeroy & Co., Inc., bidding at $15,389,115. Three other proposals were offered by such nationally known firms as Guy F. Atkinson Co. and Merritt-Chapman & Scott, Inc. The engineer's estimate was $15,581,000.

If a contract is awarded for the substructure work, the Gerwick organization, which has the largest fleet of floating construction equipment on San Francisco Bay, will act as lead contractor. Work includes 62 bell-bottom piers similar to those used on the Chesapeake Bay Bridge.

The superstructure (see diagram above) bids were surprising in that low was Judson Pacific-Murphy Corp., an Emeryville, Calif., steel fabricator-contractor, teamed with Kiewit and A. Soda & Sons, Oakland, Calif. The low bid of $21,099,319 compares with $28,052,900 for the next low bidder—American Bridge Division of U. S. Steel Corp.

The engineer's estimate was $24,419,000. The surprising factor was that an independent fabricator could underbid the large steel companies. But the costly work on the structure involves lifting into place the cantilever members (two 1,000-ft main spans each with 480-ft side spans), the thirty-six 289-ft-long truss spans and the thirty-six 100-ft-long girder spans. Thus, the lifting method, not the steel cost, would determine the size of the bid figure.

• **Injunction sought**—But there is some chance that contracts will not be awarded to the low bidders. On the same day construction bids were received, Superior Judge Hilliard Comstock of Santa Rosa, Calif., agreed to hold hearings on a temporary injunction sought by the North Bay Barrier Association to halt financing of the bridge. The injunction is sought on the basis that the Toll Bridge Authority headed by Governor Earl Warren did not give a fair hearing to advocates of a solid-fill structure that would act as a salt-water barrier. Other reasons claimed as basis for the injunction center around legal technicalities of the bond sale. If the injunction is granted, sale of the issue may be blocked.

The California Public Works Department and the Toll Bridge Authority planned to contest the injunction as they believe all the legal steps have been taken. The Toll Bridge Authority has no legal power to construct such a dike.

The San Francisco Bay Area Council got into the act by releasing results of a survey on the technical aspects of the barrier. Letters were written to members of boards who at one time or another were retained to consider the salt-water barrier.

UNDER CONSTRUCTION is the $15-million Fort Patrick Henry Dam.

TVA dam construction is bustling

Dam construction on the rivers in the Tennessee Valley Authority region is moving along in high gear this week.

Now under construction on the Holston River near Kingsport, Tenn., is the $15-million concrete gravity-type Fort Patrick Henry Dam. Late last month, completion of the $27.8-million Boone Dam on the South Fork of the Holston some 4 mi away was marked by an official dedication. Recently completed in the upper Holston area were the South Holston ($31.8 million) and the Watauga ($31.6 million) Dams.

The two latest additions to the system will supply 111,000 kw to TVA's power system. Boone has an installed power capacity of 75,000 kw in three units. Fort Patrick Henry's capacity is 36,000 kw from two units.

A semi-indoor power plant was constructed at Boone, with three Francis-type, Newport News turbines, vertical shafts. Rated capacity is 34,500 hp, 90-ft. head, and 37,000 cfs. Normal speed is 100 rpm. Three Westinghouse generators—alternating current, vertical shaft type—were installed with a rating (0.8 power factor) of 31,250 kva, 25,000 kw capacity.

At Fort Patrick Henry, two Kaplan, vertical shaft Newport News turbines will be installed, with a rated capacity of 25,000 hp, 61-ft head, and 3,940 cfs. Normal speed will be 138.5 rpm. Two Westinghouse generators—alternating current, vertical shaft type—will have a rating (0.9 power factor) of 20,000 kva and 18,000 kw capacity.

• **Structures**—Boone Dam is 160 ft high and 1,532 ft in length; Fort Patrick Henry will be 95/670. Construction was begun on Boone Aug. 29, 1950, and on Fort Patrick Henry, May 14, 1951.

Length of the Boone reservoir at maximum pool level at elevation 1,385 will be 16 river mi on the Holston and 15 on the Watauga. Total storage volume at maximum pool level, with area coverage of 4,880 acres, will be 210,000 acre-feet.

Fort Patrick Henry at maximum pool level at elevation 1,263 will have a length of 10.4 mi and a storage volume at that point of 29,850 acre-feet.

Boone is the 19th dam built by TVA and the 29th major dam in the TVA system. Lengths of its various sections are non-overflow, 394 ft; spillway, 214 ft; powerhouse, 174 ft; earth embankment, approximately 750 ft; total, approximately 1,532 ft.

The spillway crest level will be at elevation 1,350, with a clear crest length of 175 ft and a discharge capacity at high water elevation of 138,000 cfs. Five 35x35-ft radial gates were installed and one sluice, 5 ft 8 in. wide by 10 ft.

For dam and spillway, earth excavation was 110,000 cu yd; rock excavation, 29,000 cu yd; concrete, 200,000 cu yd and earth and rock fill, 500,000 cu yd. Powerhouse and tailrace earth excavation was 2,000 cu yd; rock excavation, 10,000 cu yd; and substructure concrete 20,000 cu yd. The switchyard of the main substation for northeast Tennessee is 170 by 634 ft.

Boone Dam was so named because not far from that point the famous pioneer, Daniel Boone, made this notation on a beech tree: "D. Boon cilled a. bar in the year 1760."

Looking downstream, 782 ft on the left portion of the dam is concrete. The right portion is a 750-ft long embankment of solidly packed earth. The upstream face of the embankment is protected from wave-wash by a layer of large riprap rocks. The embankment angles downstream from the concrete portion. The concrete part begins at a high rock bluff, which forms the left abutment.

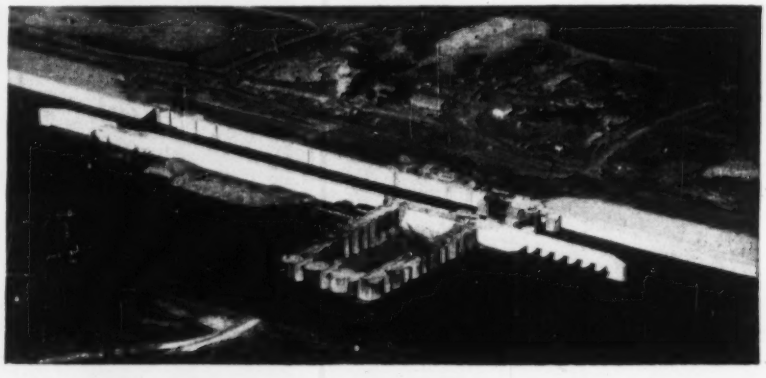
Boone and Patrick Henry construction is under the guidance of C. E. Blee, chief TVA engineer; with planning and work by TVA. Chief construction engineer is George K. Leonard.

New lock opened on the Cumberland

Col. Gilbert M. Dorland, Nashville District Engineer, pulled two small black handles on a control board and the biggest lock (see photo below) in the Cumberland River system was officially opened last month.

The site was on the Cumberland River 18 mi, downstream from Nashville near Ashland City, where the U. S. Corps of Engineers is building Cheatham Dam.

Work on the Cheatham Lock, costing about $6 million, started with construction of a coffer-dam in May of 1950. Contractors working jointly on the project have been Stevens Brothers, Miller Hutchinson & Co., and



the T. L. James & Co. of New Orleans.

When the dam project is completed, probably in early 1954, water will cover Lock A, about a mile and a half below the dam site. It will also cut out the use of Lock 1, farther towards Nashville.

• **Dam progressing**—Meanwhile, Col. Dorland said an excellent working summer and fall has enabled contractors to bring the giant $52-million Old Hickory Lock and Dam to approximately one-third completion.

The absence of rain during the most of two seasons has made it possible for the Jones-Thompkins Co. of Charlotte, N. C., to complete the 2,870-ft-long earth portion of the dam. Pouring of concrete for the 400-ft-long lock walls is well under way, and a good start has been made on pouring for the masonry spillway section of the 101-ft-high dam. When completed the concrete section of the dam will be 335 ft long.

The total installed capacity output of 100,000 kw will give an estimated annual output of 420,000,000 kwh. By the spring of 1956, when the fourth power unit starts work, full impoundment will provide a lake approximately 92 mi long.

Toll highway speeded in West Virginia

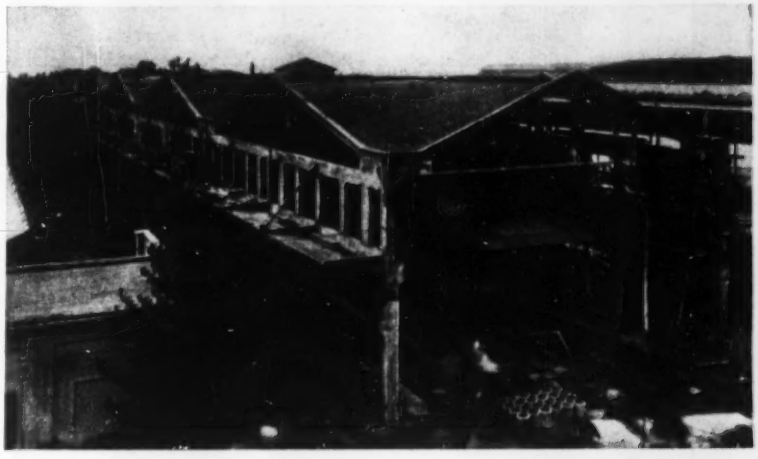
Emerging from a court fight which cost it nearly $1 million in construction delays and legal fees, the West Virginia Turnpike Commission has awarded new contracts to get major projects under way on its $96-million, north-south toll road.

Bates & Rogers Construction Corp. is scheduled to start work this week under a $2.9-million contract for construction of a 2,665-ft tunnel between the Cabin and Paint Creek valleys. Lewis & Bowman, Inc., will erect the substructure for the Bluestone River Bridge on a low bid of $248,130. Held for further study was a low bid of $3 million by Nello L. Teer Co. for grading, draining and clearing three mi from the tunnel site toward Charleston.

• **Other toll road activities**—The New Jersey Turnpike Authority, completing its first year of operation, has announced its net revenue at $14.8 million, before interest on turnpike bonds which total $8 million. Most of the revenue ($12.7 million) came from passenger cars.

The New York Thruway Authority has opened another five-mi section from the outskirts of Saugerties southward to County Road 41 and linking with Route 9W along the west shore of the Hudson River.

HYPERBOLIC PARABOLOID ROOF of light-gage aluminum showed high strength in tests of an experimental 22x22-ft building bay at New Hyde Park, N. Y.



THIN-SHELL CONCRETE ROOF of the Alfa Romeo Automobile Co. warehouse in Milan, Italy, built in 1929, is a prototype of the hyperbolic-paraboloid metal roof. Though bays are 140x160 ft, the reinforced concrete roof is only 1 in. thick.

Beamless, light-gage roof developed

Plans are being made by Georgio Baroni, former professor at the University of Milan, Italy, and now treasurer of the Baroni Construction Co., New York City, to manufacture metal and plywood roof deck for a beamless roof construction he has developed.

Mr. Baroni has built a large number of structures with this type of roof in Europe and South America, of reinforced concrete only 1 in. thick. These structures have cantilever spans ranging up to 70 ft; yet, there are no beams in the interior.

The feasibility of constructing beamless roofs of light-gage metal was demonstrated early this month by tests on full-size roof sections in New Hyde Park, N. Y. For the purpose, a 22x22-ft building bay was erected with a roof made of double-curved sheets of 0.064-in. thick 61S aluminum supported at the center of each bay on an oversized steel-pipe column.

The roof is a hyperbolic paraboloid (saddle shaped). It has a rise of 5 ft from the outer edges to the center. There are no beams in the interior, but stiffeners extend from the center to the four corners and along the periphery. Tested with a load of 60 psf over the entire surface, the light-gage metal showed no permanent deformation on removal of the load.

Mr. Baroni plans to standardize on 22x22-ft bays and 40x40-ft bays. He will manufacture the double-curved sheets of light-gage metal or metal bonded to plywood.

This construction also may be used for floors. In tropical or arctic regions, it may be used to advantage for floors in the inverted position; then only the crown contacts the ground.

AGC contractors oppose wage hike

Fred W. Wright of Nashville, Tenn., president of the Tennessee Associated General Contractors, charged that approval last week of a 5.3% wage increase by Tennessee Valley Authority for some 12,000 operating, maintenance and construction workers in eight states is a blow to the region's economic stability.

"The AGC is opposed to any unusual increases in the labor rate while the nation is attempting to stabilize its economy," Wright said, in describing the TVA hikes as "excessive."

The effect of the TVA raises, effective Jan. 4 upon approval of the Wage Stabilization Board, will be to force "individual contractors to compete with the higher TVA rates," he said.

In the past, say contractors, this pattern has emerged: TVA first negotiates its wage increases, the various unions then reopen negotiations with AGC and the AGC is forced to increase its scales close to the new TVA rates.

• **AGC rebuffed**—J. E. Willard, president of the Knoxville AGC chapter, declared, "We never have been consulted at any time during the history of the TVA on these wage negotiations."

The Knoxville AGC had been rebuffed after asking this year to be consulted during annual negotiations, he said.

Willard, member of the firm of Johnson & Willard of Knoxville, has submitted a low bid on a $6-million project in Knoxville—the University of Tennessee Memorial Hospital and Research Center. His bid, based on present labor costs, could be thrown out of kilter by a new wage scale.

Willard said he had been told by TVA officials that TVA could not operate as private contractors do. "Yet we have in our group one contractor who does business in 20 states," he added.

The AGC will investigate the new wage scale set by TVA to determine whether there is ground for an official protest to TVA or some other federal agency, C. P. Street, AGC president-elect, said last week.

Street disclosed that four years ago he was chairman of an AGC committee which was informed by TVA that its wage rates were higher than those paid by independent contractors because the differential was needed to maintain the TVA construction organization, particularly in remote spots. Street said the committee pointed out that such a practice was contrary, as he saw it, to the federal law requiring wages of federal projects to be the prevailing scale of the region.

• **New wage scales**—The new TVA scales were negotiated at conferences between Harry Case, TVA personnel director, and Samuel L. Rope, president of the Tennessee Valley Trades and Labor Council, which is bargaining agent for 16 AFL craft unions.

The increases, effective through 1953, are just under the 5.8% average increase for 1952. Agreement on the new schedule was reached Dec. 12. The wage talks represented the eighteenth annual conference between TVA management and the council.

The new pay scales range from $1.30 per hour for unclassified labor to $2.77½ per hour for electricians and steamfitters.

Safety order results from high fatalities

The first of three 90,000-kw units in the new Ross power plant of the Seattle City Light Co. will go on the line at least two weeks later than planned, partly as the result of six fatal accidents on the project.

The original schedule had called for the first power delivery Dec. 15, but City Light admitted that this schedule could not be met. Deliveries have been delayed and custom on the Skagit project calls for a day off for everyone after a fatal accident.

After the sixth fatal accident, the State Department of Labor & Industries issued a new safety order, designed to prevent further loss of life. Ed Sorger, state supervisor of safety, said a personal investigation revealed the basic cause of the loss of life was a "pressing schedule making it necessary to expose workmen to hazards to which they would otherwise and normally not be exposed." He said several jobs had been under way, one above the other, in the 200-ft shaft leading to the intake tunnel. Men on the lower levels were endangered by falling timbers or metal, he said.

Reinstatement ordered

A local of the AFL carpenters in Pittsburgh, Pa., has been ordered to reinstate three brothers it expelled two years ago over an argument they had with a union official.

The order came from Judge Russell H. Adams of the Allegheny County Common Pleas Court. He also told the local to pay the brothers all the wages lost because they were ousted.

The brothers were thrown out of the union and fired from their jobs on July 26, 1950, while working for the Runkin-Conkey Construction Co. on a Pennsylvania Turnpike job at Unity, Pa.

The local involved was 2274 of the AFL United Brotherhood of Carpenters and Joiners.

Regional wage board drives against overpay

Continuing its drive against overpayments to workers, the Ohio-Kentucky Regional Wage Stabilization Board in Cleveland last week returned tax disallowance findings against 31 employers, 27 of them in the construction trades. Penalties totaled $80,929.

Most of the findings were against small plastering and mason contractors in the Greater Cleveland area. Largest disallowance was against the Pedone Lathing & Plastering Co., Cleveland, for $13,535.

Simultaneously the WSB announced it was processing a case against the F. & S. Construction Co., and Hoffman Plastering Co., for an alleged $13,000 overpayment to plasterers and construction laborers. In addition to paying above legal scale, the WSB charged that F. & S. gave some workers $6 a day.

Many of the violations occurred between June and November of last year when there was a shortage of workers in the trades involved in the complaints.

Two union men held in assault on agent

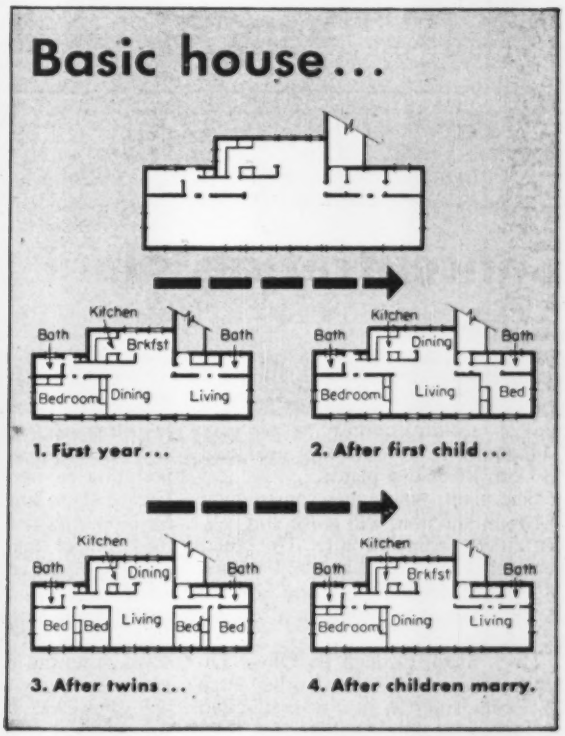
Two members of Local 207, structural ironworkers union (AFL), were bound over by a Youngstown court to the Mahoning County (Ohio) Grand Jury last week on charges of assault with intent to kill.

Gedio Filigenzi and Anthony Moses, both of New Castle, Pa., were charged by William Thomas, union business agent, following a fight at union headquarters in Youngstown, Ohio, in which Thomas was severely injured.

Earlier, in the same court, similar charges were dismissed against five other members of the union.

ON THE OUTSIDE, a model house in San Antonio, Tex., looks like an attractive, conventional building, but inside . . .

WALL UNITS are mounted on casters and are lowered with built-in screwjacks to roll on them, so that . . .



ROOM ARRANGEMENTS can be varied at little or no expense to meet a family's needs as it grows.

Walls roll where they are wanted in flexible house

A builder in San Antonio, Tex., believes he has the answer to the problem of building a house flexible enough in room arrangements to meet a family's needs from newlywed days through old age.

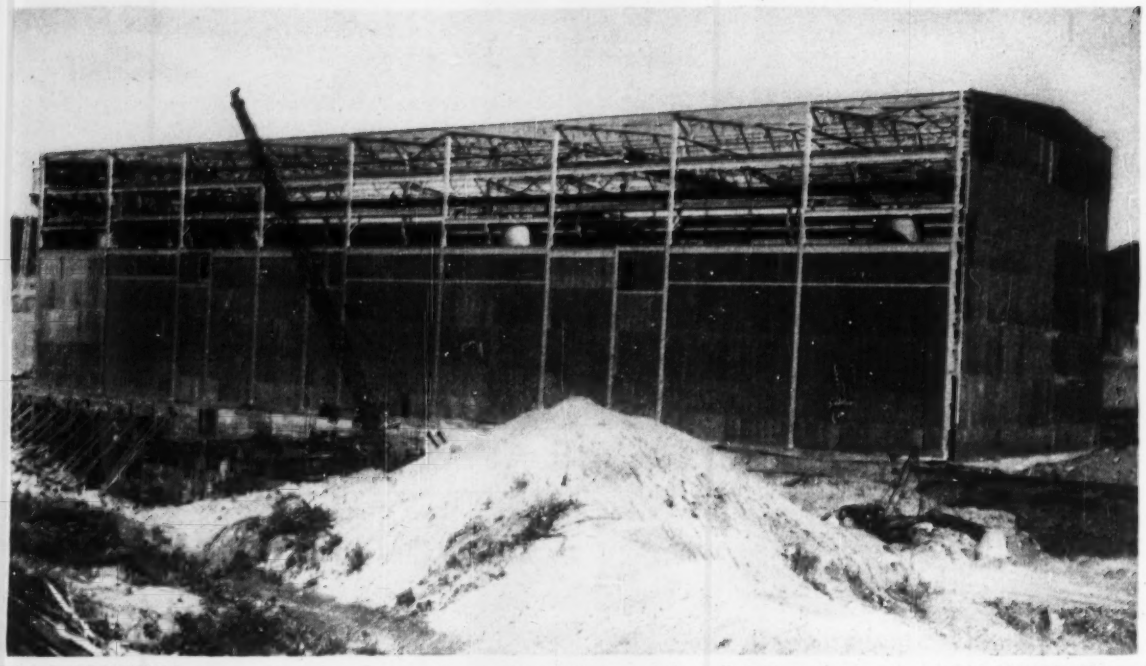
Frank Robertson, whose firm constructs between 150 and 250 houses a year, has just erected five model houses, each with 1,250 sq ft of floor area, to prove his point.

The only permanent walls in these structures are the exteriors and those around the kitchen and two bathrooms. The owner can shift the other walls and partitions easily to subdivide the space as desired. Without any knowledge of carpentry, he can create from one to four bedrooms or convert the dwelling into a two-family unit that would include an efficiency apartment. To date, 72 different variations of room arrangements for the same basic house have been blueprinted.

Robertson employs six movable wall units, for which he has applied for a patent. At the bottom of each unit are casters, on which it rolls, and four screwjacks. When a unit is in place, the jacks raise it to contact the ceiling and lower a baseboard to the floor, at the same time retracting the casters. There is enough pressure from the jacks to hold the unit in place and keep it plumb.

Some of the wall sections are double-purpose. They serve also as storage partitions or bookcases, or shelf space.

The five experimental houses were designed by Frank Robertson, Jr. They will be used for consumer acceptance tests.



FINAL CRUSHING of taconite rock and magnetic separation of iron particles will start next spring in this 306x195-ft building of U. S. Steel's Oliver Iron Mining Division, near Mountain Iron, Minn.

Concentrating plant is key to taconite

(Last of three articles)

BY NEXT SPRING the Oliver Iron Mining Division of U. S. Steel Corp. will start producing about 500,000 tons of taconite concentrates per year. The complete experimental operation will consist of two plants.

One plant, now under construction at Mountain Iron, will crush and concentrate the crude taconite. The other, completed last year at nearby Virginia, Minn., will combine the fine iron ore concentrates into usable-sized sinter, or nodules.

U. S. Steel, through its Oliver Division, has joined several other large steel companies to go into production of high-grade iron concentrates from the low-grade iron-bearing taconite rock found in abundance on the Mesabi. One group of steel companies has a 300,000 ton-per-year processing plant at Babbitt, Minn., through the Reserve Mining Co. Another group has a 200,000-ton-per-year plant near Aurora, Minn., which is operated by Erie Mining Co. (ENR Dec. 11, p. 10).

Oliver's pilot concentrating plant at Mountain Iron will reduce taconite rock to flour-fineness by four stages of crushing and two stages of grinding, followed by magnetic extraction of the fine particles of iron ore from the waste materials.

• **Sinter or nodules**—The experimental agglomerating plant at Virginia will transform the powdery iron ore into porous clinkers by sintering, or into nodules. The agglomerated lumps will probably average 60% iron, or more. Moreover, they must be tough enough to withstand freezing and thawing as well as rough handling during transportation to steel mills on the lower Great Lakes. There they will be tested for properties that will permit efficient blast furnace operations.

Pilot plants ordinarily are thought of as small-scale working models. By comparison, this is true of both the Mountain Iron and Virginia plants, considering the size of the commercial plants to follow. No estimate is available, however, of the annual production of these commercial plants.

Each pilot plant is a multimillion-dollar project. The sintering and nodulizing plant at Virginia is equipped with a tremendous outlay of special machinery needed for the complex agglomerating operations.

The construction and development work at Mountain Iron will run into a high cost. In addition to the concentrating plant, Oliver is opening up its taconite mine nearby and constructing a clay-seal rolled earthfill dam to form a tailings reservoir.

• **Near Mesabi's first mine**—Oliver's taconite mine is only a short distance from its famed Mountain Iron mine, where merchantable iron ore was discovered 63 years ago. It was there on Nov. 16, 1890, that Capt. J. A. Nichols—an employee of the Merritt Brothers—discovered the first ore on the Mesabi Range (spelled Missabe at that time).

A shaft was sunk in 1892 and the first car of ore—assaying 65% metallic iron—was shipped via the old Duluth, Missabe & Iron Range Railroad to Duluth, where it was placed on exhibition. A total of 4,245 tons of ore was mined and shipped that year. Seven years later annual shipments of ore had increased to 1,000,000 tons.

The mine was not operated from 1909 to 1943, but has been in continuous operation since. It has produced a total of 42,000,000 tons of ore up to the present date.

• **Stripping and jet-piercing**—Development of the taconite mine is now under way. S. J. Groves & Sons Co., Minneapolis, is removing 1,500,000 cu yd of overburden from an area about 1,000 ft wide by 3,000 ft long. Removal of this overburden, which ranges from 15 to 30-ft in depth is nearing completion.

The next step will be to assemble drills for drilling the tough taconite, big electric shovels for loading, and provide rail haulage by diesel locomotives. A big water supply system will be needed, as well as the construction of power distribution lines and substations.

Construction of the crushing and concentrating plant near Mountain Iron was started in May of last year.

OVERBURDEN is being removed from Oliver's taconite mine (at left) by the shovel-and-truck method (at right). Large-scale stripping operations later will employ rail-haulage of the waste material.

LEE McKENZIE, assistant mine superintendent, inspects pile of taconite rock.

A LARGE EARTH DAM is being built across a deep gully to form a reservoir for taconite tailings.

Largest building in the plant is the concentrator, measuring 306 ft long, 195 ft wide and 78 ft high. It is steel-frame construction with corrugated metal siding, insulated with 2 in. of glass wool.

• **Plant operations**—When the plant starts operating next year, taconite rock from the mine will be delivered by standard gage rail to a crude ore pocket, whence it will be fed by conveyor to the primary crushers. The initial haul from mine to crushing plant will be about one mile, on a 1½% maximum grade. This distance will be increased, of course, as the taconite mining operation is developed over a larger area.

An underground conveyor will carry the material from the primary to the secondary crushers. Thence, another large belt conveyor—partly underground and partly elevated—will carry the taconite rock (crushed to about −¾-in. at that stage) to storage silos in the concentrator. Ball mills, rod mills, and magnetic extractors will be located in this building.

The end product from this building—a powdery concentrate of iron ore—will be shipped by rail to the agglomerating plant at Virginia, Minn. From the Virginia plant, the nodules or sinter will be shipped to Duluth or Two Harbors, Minn., via the Duluth, Missabe & Iron Range Railroad, for lake shipment to the mills for final processing.

• **Big commercial plants to follow**—No estimate is available at this time as to how extensively the Oliver Division will engage in the commercial production of taconite concentrates, or when the construction of additional concentration and agglomeration facilities will be started. The program first embraces experimental operations of the pilot plants. From what is learned in them Oliver may later construct a commercial-size taconite plant. Such a plant necessarily would be large, since 3 to 4 tons of taconite must be processed in order to make one ton of iron ore concentrate.

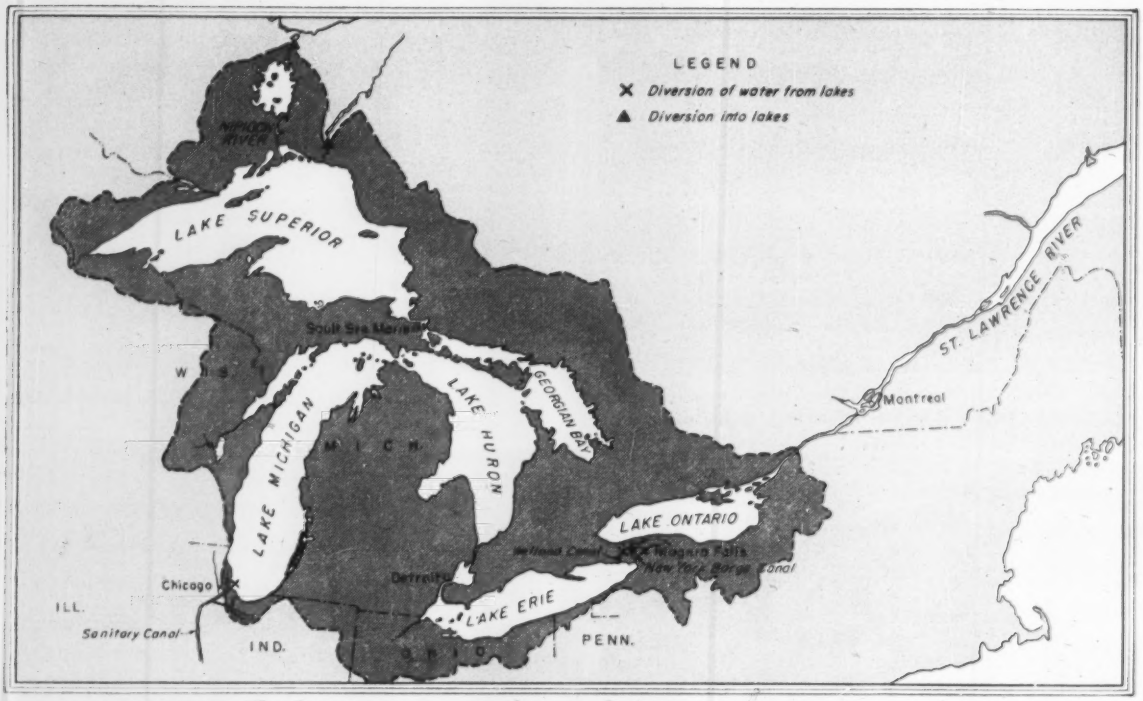
Apparently there is an ample supply of taconite rock in that area. The Oliver Division spent two years drilling the taconite to delimit the area of the concentratable material, and to analyze its chemical and physical characteristics. During that time drill crews bored over 12 mi of exploratory diamond-drill holes in the hard taconite rock. Test cores were analyzed in Oliver's 8-year-old research laboratory in Duluth.

The pilot concentrating plant is being built by Stearns, Rodgers Co., Denver. Elmer G. Stone is in charge of construction for Oliver.

Oxygen gas experiments made for sewage plants

Daniel A. Okum, visiting associate professor of sanitary engineering at the University of North Carolina's School of Public Health, Chapel Hill, N. C., has been awarded a $7,949-grant from the National Institute of Health to study the uses of oxygen gas in sewage treatment.

The grant will cover a two-year period in which Professor Okum's research will include studying the effect of high concentrations of dissolved oxygen on the activity of the micro organisms active in the biological treatment of sewage, and the use of oxygen gas in the treatment of industrial wastes.



VAST GREAT LAKES DRAINAGE BASIN whose complicated hydrology makes lake level predictions by normal means uncertain.

Statistics can foretell Great Lakes levels

Donald M. Pierce and John E. Vogt
Sanitary Engineers, Division of Engineering
Michigan Department of Health, Lansing

WE PREDICTED LAST MAY—with a confidence of 95%—that the monthly mean elevation for the high month of 1952 on the Michigan-Huron unit of the Great Lakes would fall between 582.0 and 583.6; that most probably it would be 582.75.

Our prediction was verified as the year's high monthly mean hit 582.70 in August.

With statistics as our tool and 92 years of record our raw material, we were able to determine certain relationships that permitted us to make this prediction, with its indicated degree of accuracy.

Statistical relationships are definitely usable for lake level prediction. Monthly mean high elevation of the lakes can be told several months ahead. On the other hand, no correlation has yet been found between rainfall and water levels in the Great Lakes.

Much study has been devoted to finding some practicable method of prediction. Attempts have been made to find cycles in rise and fall of lake level and to correlate them with rainfall cycles. But figures from the U. S. Lake Survey records (averages of strategically located level measurements by the Corps of Engineers) support none of the theories of hydrologic cycles that have been advanced up to the present time.

In June, 1952, the Great Lakes Division, Corps of Engineers, issued a preliminary report on property damage along the lakes due to level fluctuations (ENR July 3, p. 26). This report concluded:

"It is difficult to forecast lake levels more than a month in advance . . . because of . . . limited knowledge of the relationships between the hydrological factors . . . and the ensuing levels. Difficulty stems from complexity of . . . causative factors. All studies to date have been handicapped by lack of basic data . . . insufficient to establish relationships between these (causative) factors and the levels."

• **Forces influencing levels**—Changes or fluctuations in lake levels are due to a variety of forces—natural and artificial.

Long-range fluctuations in level may be due to variations in rainfall and evaporation or tilting of land surfaces. And runoff, too, is a major and difficult-to-measure factor influencing lake level.

Tilting of the land has a very slight effect, although it has changed

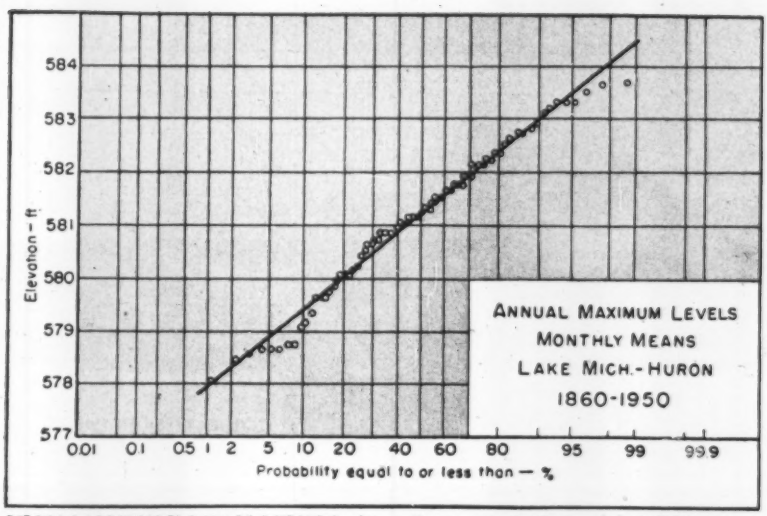
PREDICTING LAKE LEVELS

Last spring while on leave of absence from the Michigan Department of Health to do graduate work at the University of Michigan, the authors made a study of fluctuations in levels of the Great Lakes. They examined 92 years of level records compiled by the Lakes Survey Division, Corps of Engineers, for the Huron-Michigan hydraulic unit.

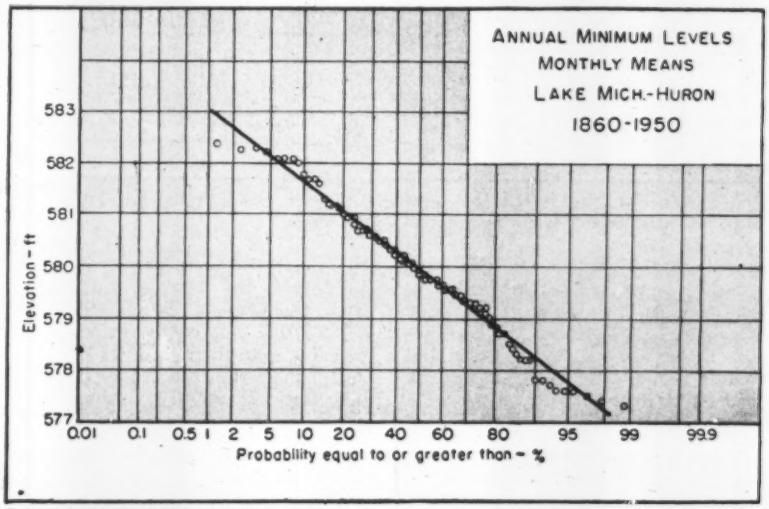
Their study is given significance by the current interest in levels of the Great Lakes—interest roused by $61-million worth of damage to shore properties by high water during the last year (ENR June 5, p. 27).

In this study, past records were analyzed from a statistical viewpoint using methods developed by C. J. Velz—now head of Michigan's department of public health statistics—when he was head of the civil engineering department while at Manhattan College.

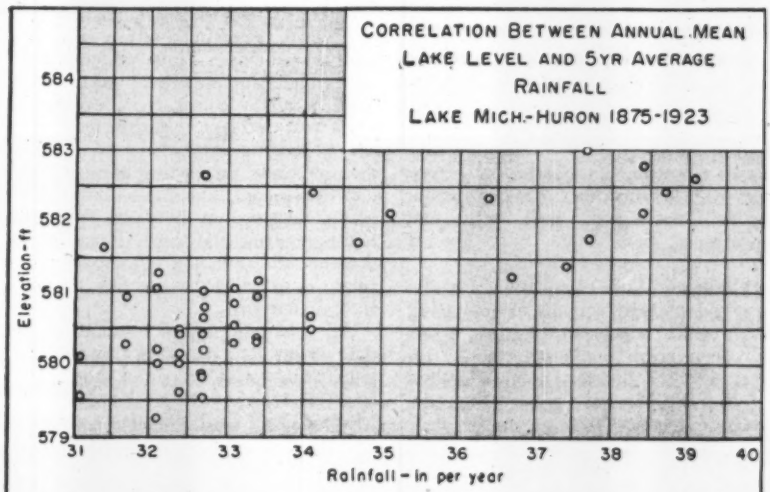
Methods have been developed by the authors with which predictions of annual monthly mean high level can be made, months before its occurrence.



HIGH MONTHLY MEAN LEVELS plot well as a straight line on probability paper.



LOW MONTHLY MEAN LEVELS make an equally good straight line of probability.



NO PATTERN HERE—Plotting rainfall figures vs. lake levels suggest no correlation.

the whole character of the lakes through geologic times.

Ice obstructions in outflowing streams plus freezing effect on runoff do tend to influence lake levels seasonally.

Transient changes due to wind and barometric pressure can be severe—especially on Lake Erie, where shallow depth provides limited capacity for subsurface return currents. Also, with the lake's long axis paralleling a recognized storm path, the fluctuations reach great magnitude. Differences in elevation between east and west ends of the lake often reach 12 ft and have been gaged as high as 15.3 ft.

There have been times when strong east winds have driven into the west end of Lake Erie and actually caused the Detroit River to reverse its flow for a period of time.

On Michigan-Huron the transient change due to wind is less severe and less frequent; but differences in level up to 2 ft do occur.

Barometric fluctuations, caused by differences in air pressure on the surface of the lake, can amount to several feet for a short period of time; the phenomenon somewhat resembles a tidal wave. And actual tides do exist on the Great Lakes, though they have been found to measure less than two inches.

• **Man-made effects**—Diversions from and into the lakes are shown on the accompanying map. The U. S. Lake Survey reports that full effect of a diversion upon lake levels is not realized for about 10 years.

Channel improvements in the St. Clair and Detroit rivers from 1860 to 1900 may have lowered somewhat the level of Lake Michigan-Huron, but experts disagree as to whether it was a measurable amount. Deforestation, similarly, has an effect—but an inconsequential one.

An artificial force having measurable effect on water in Lake Michigan-Huron is the controlled inflow from Superior. However, control works at St. Mary's Falls are intended only to keep Lake Superior's level at what it would be with natural outflow. Therefore, control has no more than minor effect on levels of Lake Michigan-Huron.

There is no man-made control regulating outflow from Lake Michigan-Huron. But owing to backwater effects, natural controlling factors frequently operate, in a somewhat complicated manner, to affect the levels of those two bodies of water.

In aggregate, some of the natural and artificial forces affecting lake levels counter-balance each other. In the case of Lake Michigan-Huron, com-

bined forces cause a range of 2 ft in monthly average lake levels for any one year. The difference between maximum and minimum monthly mean elevations recorded over the whole 92 years of record has been just over 6 ft.

• **Statistics over hydrology**—The opinion of some who have made long and exhaustive studies is that all man-made controls tend to balance out in their effect on lake levels. Lacking information to the contrary, we decided to disregard forces responsible and merely make ours a study of patterns of level variations over the period of record.

Data used are from the U. S. Lake Survey and represent mean elevation of total lake surface for each month, as determined from recording gages located at many stations along the shores of the two lakes. Such elevations are thus adjusted for local effects of wind and barometric pressure variations.

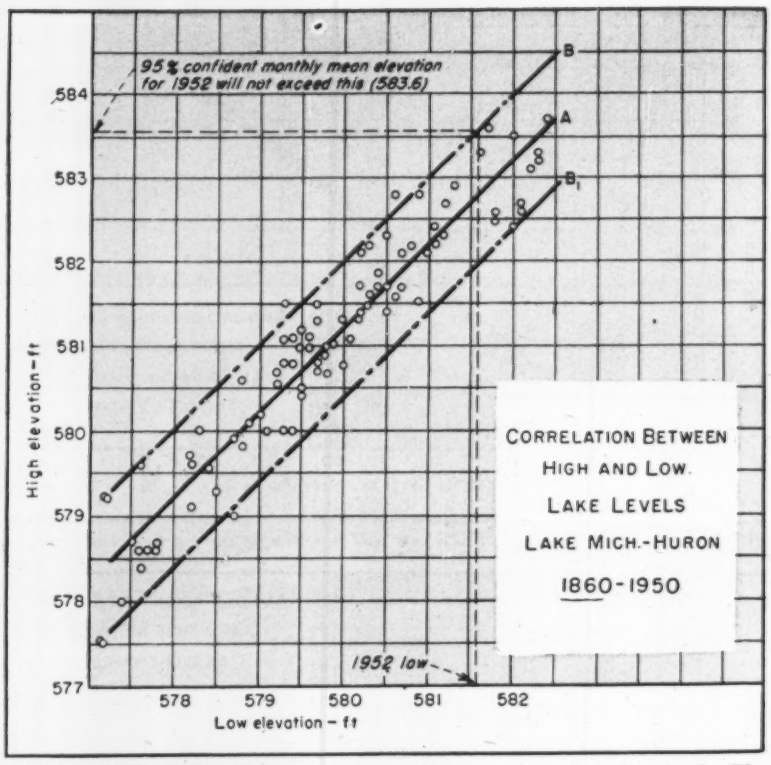
Highest and lowest monthly mean elevation for each year were recorded, then arranged in order of magnitude, for high levels, low levels and differences.

A further rearrangement of data made possible correlation between high monthly mean elevation of a given year plus the following annual low monthly mean, and the succeeding high monthly mean elevation. For example, if annual high monthly mean elevation for 1951 occurred in July, and the following low monthly mean came in January, 1952, these two values could be used as bases for prediction of the high monthly mean elevation for 1952.

Additional studies were made to develop a relationship between annual mean lake level and the preceding five years' rainfall. It became evident from widely scattered distribution of values that correlation can not be established within meaningful limits. This does not mean necessarily that a closer relationship does not exist, but rather that it has not been established on the basis of information available to the authors at the present time.

• **Probabilities do plot well**—Monthly mean highs, monthly mean lows and high-low ranges were plotted on normal probability paper. Straight lines drawn through the plotted points showed very good fit. This means that distribution of values for the period of record is normal and derived from the same universe—with balanced distribution around a mean, centering value.

The mean of annual high monthly mean elevations is 581.2. This is the most probable value for the high monthly mean. The curve indicates that four or five times in 92 years this figure would exceed 583.5. Actually, it did exceed 583.5 twice and equaled it once in 92 years. A similarly close check may be made on the 90% certainty that elevation 583.0 should not be exceeded. Nine values in 92 years should exceed it; eight actually did exceed it.



BASIS FOR PREDICTION is this correlation between past high and low levels. The range between the two is the indicator of future levels.

An equally good straight line was plotted on the low monthly mean value. This figure will be 579.9 or higher 50% of the time; 10% or 9 values in 92 years should exceed elevation 581.6. Eleven figures did exceed it during the period for which there are recorded data.

The range of high-to-low monthly mean elevations should be 1.25 ft or less 50% of the time. This and other probabilities check well with past records.

• **Highs and lows correlate**—Using the method of least squares and plotting high against corresponding low values for each year (single correlation) on cartesian coordinates, a straight line of best fit indicates a very high degree of correlation.

This line of best fit is the mean correlation, or 50-50 chance of occurrence.

Then, to increase the margin of certainty, two standard errors, or 95.5% certainty, are employed above and below the line of the mean. This produces a band extending 0.80 ft each side of the mean. This indicates that there is a 95.5% certainty that the difference between high and low monthly mean values for any given year will lie between the mean (1.22 ft) plus or minus 0.80 ft —or between 0.42 and 2.02 ft.

Thus the yearly range of levels may be estimated within desired confidence limits.

Next, to narrow the range around the mean difference within any desired confidence limit, calculations were made for multiple correlation. High monthly mean elevation for a given year and low monthly mean for the succeeding year were used as basis for predicting succeeding annual high monthly mean. There is a close correlation relationship between the first two figures and the third. However, it does not add sufficient refinement over single correlation to warrant the extra calculations.

All calculations and tabulations of data upon which the accompanying curves are based are included in our research report entitled "A Rational Method for Predicting the Annual Fluctuation in Level of the Michigan-Huron Lake System."

We, the authors, have a limited number of copies of the report available on request.

Packaged waterworks pays off

ROUND, STEEL AND CHEAPER—Novel design of new 2.6-mgd water treatment units in Westmoreland County, Pa., saved money on construction. Turbulent flocculation occurs inside center baffle rings, quiescent settling outside.

A DEPARTURE from conventional waterworks design—a circular, steel unit incorporating chemical mixing, coagulation, settling and filtration—has now had two years' trial in Alexandria, Va. Low operating costs, flexibility and ease of operation are claimed to have resulted from its use.

So pleased has been the American Water Works Service Co. with its novel purification design that it has designed similar plants for another operating company and a municipal authority it services. These have been installed by the City Water Co. of Chattanooga, Tenn., and the Municipal Authority of Westmoreland County, Pa. And three additional installations are soon to be built at others of its plants, according to American's chief engineer, E. H. Aldrich. (Patents have been applied for by Mr. Aldrich.)

The biggest advantage of the new design is claimed to be in construction costs. Alexandria's 13.5-mgd plant averaged $65,000 per mgd of capacity to build, says Mr. Aldrich, and he cites $100,000 to $300,000 per mgd as the range for plants of conventional design and similar size.

As further indication of capital cost savings, the following estimates were made recently for Ashtabula, Ohio, based on unit prices actually bid on a portion of the work: $700,000 for a conventional filter plant; $350,000 for two 2-mgd American units that would do the same job.

• **Process not changed**—Water treatment in the American plant is by the conventional major steps. But these steps are all built into a single circular steel unit, and as many units as plant-size demands are operated in parallel.

Each unit at Alexandria is an independent mixing, settling and filter plant of 2.25-mgd capacity. It is a steel tank, located in the open, above ground.

Water flows in at its center, into a mixing tank of 24-ft diameter. Surrounding this is an annular settling compartment, 76 ft in outside diameter. Then a 3-ft wide annular filter bed encircles the periphery of the unit. Water depth in all compartments is 15 ft.

Chemicals are introduced into the raw water influent pipe to each unit, where a quick mix is obtained. Mixing and flocculation continues in the unit as tangentially introduced flow is swirled against vertical baffles. Flocculated water passes to the settling compartment through baffled, horizontal slots near the bottom of the mixing compartment ring.

Movement through the annular settling compartment is upward and radially outward. Its velocity decreases throughout its travel until it goes over the top of the second annular ring into the filter compartment.

The filter bed is 30 in. of sand with effective size between 0.45 and 0.50 mm and uniformity coefficient of about 1.6. Porous plate and a patented porcelain filter bottom have been used. Below the filter bottom is an annular filtered water compartment 3 ft wide and 4 ft deep.

For wash water removal, a drain gullet one foot wide separates the filter and settling compartment. This concreted channel conveys wash water to a drain for disposal.

• **Plant layout**—Initial installation at Alexandria was four units, with space, piping and control elements laid out for an eventual twelve. The fifth and sixth units are now being installed to make total capacity 13.5 mgd.

Control valves are grouped for pairs of units and housed in a structure between each pair. But filter controls are in a central control building. Loss of 8 to 10 ft of head rings a bell to tell the operator a filter needs washing. And a pushbutton starts a completely automatic washing cycle. All usual filter operations, filtering and washing, can be controlled in rate from this central building.

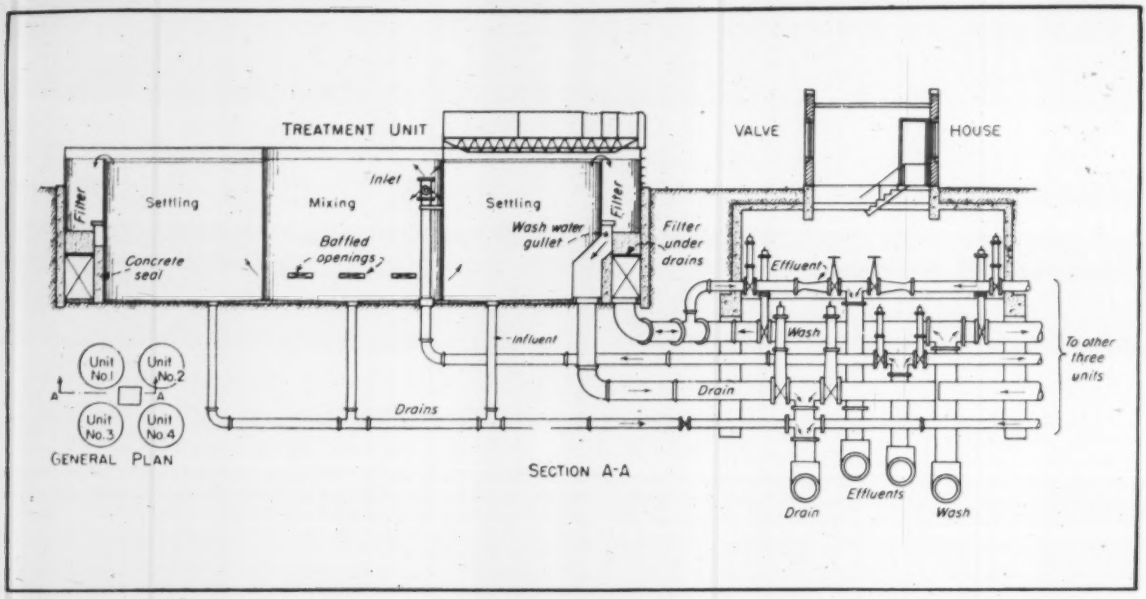
In Westmoreland County, Pa., a new supply in use since last February is treated at a four-unit plant similar to Alexandria's. Units are rated at 2.6 mgd. They give 44 minutes detention in mixing, 4.35 hours in settling. Piping and controls at this Beaver Run plant are large enough to allow filters to handle 100% in excess of their rated capacity. The Alexandria plant has 50% extra capacity.

The Pennsylvania units are banked up with earth to a point 4.5 ft below their tops. And a single valve chamber services all four (see photo above). Otherwise they are essentially the same as the Alexandria design.

In Chattanooga, Tennessee River water is treated at a 10-mgd American works, built as an addition to a 32-mgd plant. Four units, rated 2.5-mgd each but capable of twice that, went into service last May.

A variation in design of this plant permits it to produce water of substantially zero turbidity, color and manganese for its textile-mill customers. Purification units were built with launder troughs around their tops at both the mixing tank ring and the settling tank ring. These troughs bring settled water to a point where it can be treated with lime for manganese removal just before filtering.

A three-story central valve chamber services all four units of this plant. The floor above the operating valves houses lime dry feed machines and



SIMPLE, FLEXIBLE AND EFFICIENT are the claims made for the circular units. Sectional view through valve house and one of four units it serves indicates structural and hydraulic detail.

chlorine feeders. The top floor is used for storage of lime.

• **Operating results**—E. H. Aldrich admits that many features of these new purification units have been experimental, and minor alterations continue to be made. But after two years of operation, he is satisfied that they have met their requirements successfully.

In Alexandria, a water having color combined with manganese and low alkalinity is the treatment problem. Chemical costs have varied between $3.69 and $10.22 per million gallons treated, with an average of about $8.00. The Westmoreland plant treats a water containing considerable acid mine drainage, iron, and manganese. To date, no alum as coagulant has been used. Aeration, lime, and chlorine have been the chief treatment chemicals.

During the six months of operation, chemical cost has averaged $4.35 per million gallons.

At Chattanooga, alum is the coagulant and lime is used on top of the filters to aid in complete elimination of manganese. No separate costs for chemicals can be determined for the new Chattanooga plant, since it is combined with the existing plant, but the chemical cost for the entire waterworks during the last three months has averaged $3.12 per million gallons—a very low figure.

Water for washing filters varies among the plants from 1.5% of output at Westmoreland to 2.7% at Alexandria. In addition, about an equal amount is used to fill up the filter compartment after washing, to cushion flow into the filter from the settling compartment so the floc won't be destroyed.

At both Alexandria and Westmoreland, the labor force needed to operate the filter plant and the high lift pumping station consists of eight men: four shift men, one relief man, one maintenance man, a chemist, and a chief engineer. In addition, at Westmoreland, this force operates the low service pumping station by remote control. In Alexandria, where some hydraulic power is also generated in the low service station, four shift men are also employed in this station remote from the filter plant. No additional labor was required at the Chattanooga plant addition.

Settling and mixing compartments of the purification units are cleaned at intervals of 3 to 4 months. It takes four men 1½ hr to accomplish the cleaning; with time for emptying and refilling added, this means a unit is out of service for about 6 hr. As a maximum, the cost of cleaning the settling compartment has not been more than $50 per unit per year.

At all three plants, conditions last summer necessitated operation for substantial periods at from 30 to 50% in excess of nominal capacity.

• **Advantages claimed**—Operation of these units differs from operation in a conventional plant. Inasmuch as water passes directly from the mixing compartment to the settling compartment and then to the filters without floc disturbance, it is believed by American that better treatment results. There is substantially no loss of head from the time the water enters the mixing basin until it passes through the filter—except for the head loss in passing through the filter sand and underdrain system. When washing at a 24-in. rise rate, the loss through the filters at Alexandria is about 33 in., of which only 3 in. occurs in the porous plate underdrain. At Chattanooga, the flow line of the new units is approximately 15 ft below that of the old settling basins, and the effluent goes to the same elevation, indicating the savings in head which could be obtained if all the plant units were of the new construction.

Since in normal operation the head of water on the sand is about 8 ft, the usual negative head below and in the filter bed is practically eliminated. Air binding is avoided. The filters have been operated up to about 12 ft of loss, but normal operation is to wash at a convenient time when the head loss is between 8 and 10 ft.

• **Maintenance**—The steel tanks of these units, to be preserved, must be painted periodically. This is a standard operation. Plate used is ¼ in. thick generally; 5/16-in. is allowed for corrosion. A ⅜-in. thickness is used in outer walls.

They could just as well be built of prestressed or reinforced concrete, at added cost. But American believes that too few facts are available to substantiate the idea that concrete structures will outlast properly maintained steel structures. Mr. Aldrich cites these facts relating to ages of filter units in plants operated by his parent

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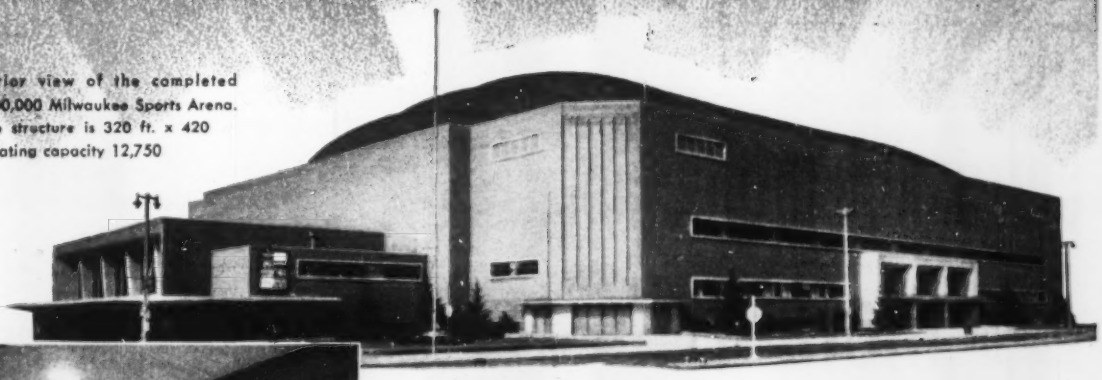

Exterior view of the completed $5,000,000 Milwaukee Sports Arena. Entire structure is 320 ft. x 420 ft. Seating capacity 12,750

Interior view of Sports Arena lobby. Note the beauty of exposed concrete masonry walls.

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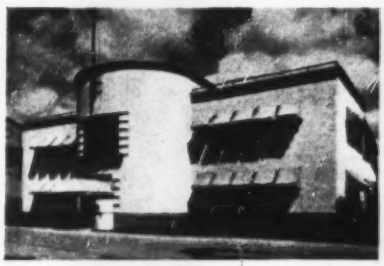

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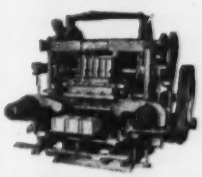
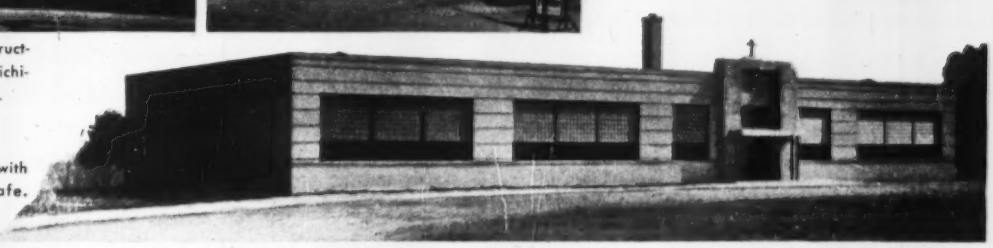


Concrete Masonry constructed club house at the Michigan State Fair Grounds.



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Swimming pool diving tower at Shamrock Hotel, Houston, Texas, being metallized with pure aluminum by the F. W. Gartner Co., in early 1949. In perfect condition June 1952.

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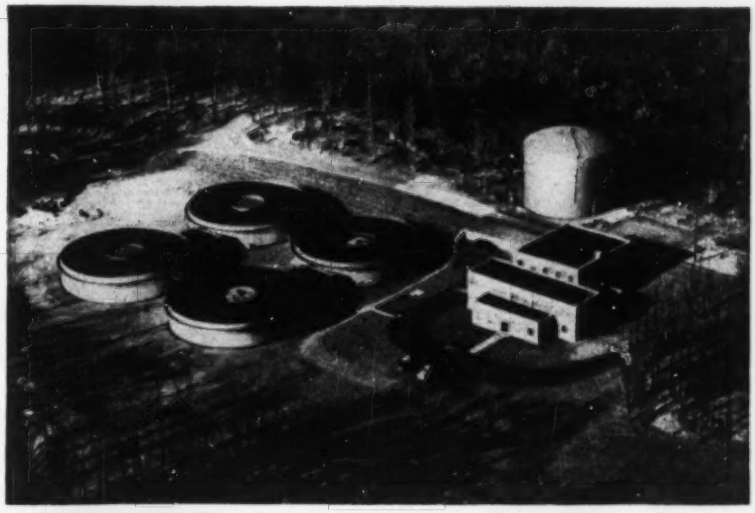


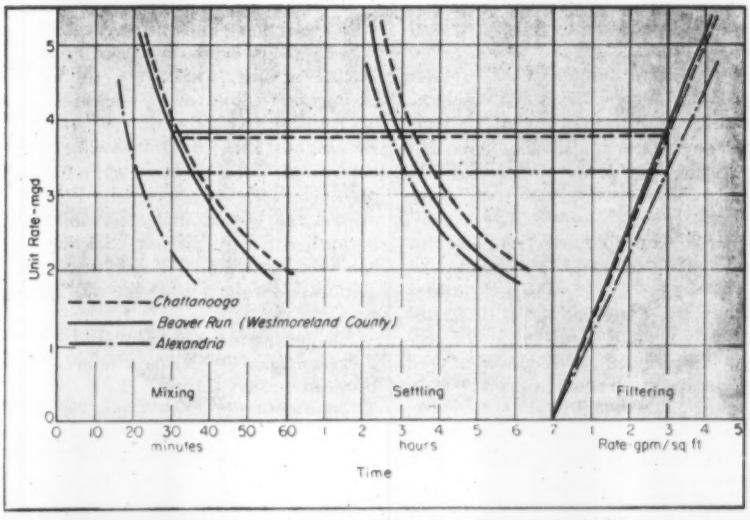
ALEXANDRIA PLANT in Virginia was the first of the type. Two years' operation speaks well for the design.

company. In 1951, 632 filter units in 61 different plants were in operation: 228 were steel averaging 41.6 years old; 305 were concrete averaging 24.9 years; 99 were wood averaging 33.3 years. The oldest steel unit was 63 years; concrete, 46 years; wood, 53 years.

Experience indicates to Aldrich that steel filters will have a life approaching 50 years. He points out that at a rate of 6% for interest and depreciation, a saving of less than 6% in first cost of a structure will entirely amortize the full cost of such a structure in 50 years. Stated another way, a $20,000 per mgd saving in filter plant construction will in 48 years at 6% interest become $320,000, four times the indicated total cost of these units.

Operations indicate that open settling basins are adequate for all parts of the U. S. except its far northern states. Ice formation in open basins sometimes requires breaking and removal in the coldest periods. Movement of water in the circular filter tends to decrease ice formation. Where necessary, agitation around the edge can be provided. Partially burying the units as in Westmoreland will protect the lower filter area, and, in extreme cases covers can be provided.

• **Possibilities**—The practical size range for these units is thought to be from less than 0.5 to 10 mgd capacity. It is believed that mechanical mixing devices could be installed in some special cases where tangential mixing may seem insufficient. Sludge collection equipment is another future possibility. Any choice of filter bottom can be used.



OPERATING DATA now are in from a second and third plant, Chattanooga and Westmoreland County.

$1-million Trane lab to study weather "magic"

Devoted primarily to the science of heat exchange, the $1-million "house of weather magic" now under construction in La Crosse, Wis., will duplicate temperature, humidity, pressure and air movement conditions that may prevail at any place on the globe.

In the new research and testing laboratory, covering four blocks on the outskirts of La Crosse, Trane Co. engineers will intensify basic research of weather conditions. In addition, they will make studies concerning expanded product development and testing of equipment.

Among projects planned for study when the lab is placed in service next year are hospital operating room air conditioners minimizing hazards of anaesthetic explosions; condensing cooling and heat transfer units to reduce water consumption in air conditioning and industrial processes, thus helping to relieve water shortages in industrial areas, and mechanical refrigeration equipment for rail and truck transport of foods to preserve flavor and prevent spoilage.

Wind tunnels and hydraulic equipment will be used to measure the flow of air and liquids and the interchange of heat between gases and liquids. A sound-isolated "quiet room" will be used for the purpose of measuring and studying noise levels of fans, motors and moving air.

The weather research lab was designed by Magney, Tusler & Setter, Minneapolis architects-engineers. General contractor is Peter Nelson & Sons, La Crosse.

Mexico City seeks drainage answers

Mexico City's chronic drainage problem may well be on its way to being solved. The newly elected administration has announced its intention to rebuild the present system completely and will issue a public call for proposed solutions.

The problem is aggravated by the nature of Mexico's subsoil, which is continually contracting and throwing drainage lines out of level. Mexico City was built on an old lake bed, and the street level is believed to have sunk some 14 ft over the last 50 years. The main collectors now flow at a level some 6 ft below the outlet sewage tunnel through the mountains surrounding Mexico City.

Any solution supposedly would include complete new collecting lines throughout the older section of Mexico City and new sewage tunnels or a sewage treatment plant.

WEST DALLAS HOUSING PROJECT, which will cost $33 million to $35 million and will house some 14,600 persons after completion in 1953. Large group of structures in right foreground and rear contain 1,500 units for Negroes. Mexicans will be housed in 500 units in left foreground. Buildings in upper left will contain 1,500 apartments for whites.

$35-million housing project under way in Texas

One of the largest low-rent public housing projects on one continuous site is going up on a 513.4-acre tract in West Dallas, Tex.

Costing $33 million to $35 million, the West Dallas Housing Project will provide shelter for about 14,600 persons. The project's 503 buildings will contain 3,500 family dwelling units—1,500 for Negro, 500 for Mexican and 1,500 for white occupants.

Initial units will be completed and ready for occupancy by the middle of 1953, and the entire project should be finished by the end of the year. Landscaping is scheduled for early 1954.

• **Slum**—The development is located in the midst of a blighted, teeming slum area that had mushroomed on former river bottom land west of the Trinity River levees. Outside of Dallas city limits—it still is—the area decayed because of inadequate regulation and zoning.

During depression years, lots were sold for as little as $5 down. Houses, crowded and pushed together, were built of every conceivable material—cardboard, abandoned sheets of metal, license plates, orange crates and scraps of lumber.

Water was obtained from shallow sand and gravel strata wherever it could be reached. Human wastes were often disposed of in the same lots where water wells were located. Many abandoned gravel pits were used for dumping of trash and garbage.

Although West Dallas contains less than 20% of the non-metropolitan population of Dallas County, the area, between 1946 and 1948, produced 50% of the county's non-metropolitan typhoid, 60% of the tuberculosis and 30% of the polio cases.

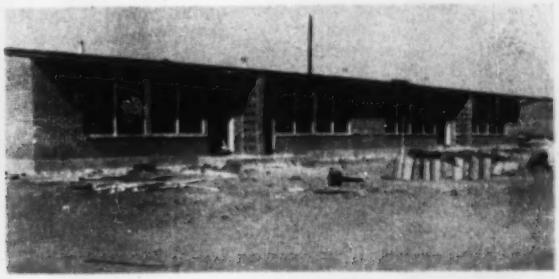
Clearly, Dallas had to remove this blight before the annexation that was sure to come. Industry already had moved substantially into the West Dallas area.

• **Site selection**—The entire West Dallas area was inspected by T. C. Forrest Jr. (ENR Nov. 13, p. 54), the Dallas engineer who planned the building of the Trinity levees in 1929-1932. Because of the low gradient of the land, storm water drainage was a major problem. The site selected by Forrest offered the best drainage possibilities because it is immediately adjacent to the west levee, a 60,000-gpm pumping station and a portion of the old Trinity River channel.

All storm water drainage will be underground. Most will run directly to the pumping station and thence through conduits under the levee into the Trinity River channel. Small portions of the project, however, will drain into a series of lagoons that formerly were old gravel pits.

The entire West Dallas area will have adequate storm water drainage

TWO-STORY ROW HOUSE. Brick veneer. Two to four bedroom units.



ONE-STORY ROW HOUSE. Brick veneer. One-bedroom units for older couples.

TWO-STORY ROW HOUSE with one-story wings. Brick veneer with cement asbestos panels. 2 to 4 bedrooms in center.

TWO-STORY ROW HOUSE with two to four bedroom units. Brick veneer with cement asbestos panels on second story.

when current Army Engineer work is completed on the West Dallas Floodway. At that time, substantial improvement of all West Dallas is expected.

Adequate sanitary sewer facilities also were a factor in Forrest's study. The housing project had to be planned in conjunction with a $1-million extension of the West Bank Interceptor Sewer. This 48-in. conduit is being lengthened five miles, from its old terminus to the outer edge of the housing project. Ultimately, it will be extended to serve all of West Dallas.

The conduit's completion is scheduled for early in 1953; and annexation of West Dallas is expected to follow shortly. Dallas civic leaders think the new housing project will bring improvement of the entire section.

• **Financing**—After Forrest's original survey, special committees of the Dallas Chamber of Commerce and the Council of Social Agencies came out in favor of the project on Oct. 19, 1950. The city council gave approval; and a contract was executed by the Housing Authority of the City of Dallas and the Public Housing Administration for federal aid in financing in February, 1951. The PHA advanced a loan of $33,708 for planning work.

For the time, financing has been effected through sale of temporary loan notes, amounting to 90% of the total development cost, to syndicates of banks. The terms of the bank notes range from three to nine months, and all loans are secured by the PHA. Interest rates on the temporary loan notes vary according to the market from 0.41% to 1.07%.

Permanent bonds will be sold in competitive bidding after the project is 40% completed and all development costs are ascertained.

Rents will be used to retire the bonds during the next forty years and for maintenance and operation costs. A federal subsidy of under 10% probably will be required, and the PHA has agreed to furnish these funds.

According to early estimates, the project was to cost $37 million. Leveling off of construction costs and intense competitive bidding brought the total down to $33 million to $35 million, which breaks down this way: Building construction, $22 million; site development and utilities, $5 million; land purchase, $3 million; demolition, $90,000; and interest, administration, architectural, engineering and miscellaneous work, $3 million to $5 million.

Dallas will own the project. From the day it opens it will be operated under city direction.

In the summer of 1951, the DHA started buying property, evicting when necessary. About $3 million was spent in getting clear title to the 513 acres and another $90,000 was used in demolition.

• **Site conditions**—Because many gravel pits had been used for garbage disposal, certain areas of the site were classed as "unbuildable." Nevertheless, they were cleaned up, graded and will become recreation areas. About 1,000,000 cu yd of earth had to be moved.

Subsurface soil explorations indicated two basic types of foundation construction would be necessary:

On most of the site and in areas nearest the river, adequate bearing could be obtained on blue shale at an average depth of 20 ft. Foundations for all structures where this condition existed are of creosoted wood piling driven to bearing on the shale. On higher portions of the site—in the southwest corner—adequate bearing was obtained at a much shallower depth. In this section engineers decided the most economical type of foundation would be drilled and reamed poured-concrete piers.

• **Buildings**—In an effort to eliminate a "barracks feeling" varying designs and colors are used. Individual structures will contain anywhere from four to eight units, of conventional one and two-story row-house design.

The tract will contain 86% two, three and four bedroom units in two-

story buildings and 14% one-bedroom units in one story structures. This will provide one-level living for older couples needing small quarters.

The one-story buildings are arranged at major street and perimeter areas so that larger units, which will house most of the children, will be away from major street intersections.

Most of the buildings have brick exteriors although some of the two-story buildings use cement asbestos panels on the exterior walls of the second story.

Efforts have been made to achieve architectural interest, without hiking costs, by the use of various entrance treatments and different colors for exterior doors.

Some of the buildings have flat roofs and others have a two-on-twelve pitched roof. All roof surfacing is 5-ply, 20-year bonded tar and gravel or asphalt and gravel construction.

Future maintenance costs will be low because items requiring exterior painting are at a minimum. Metal windows are used throughout.

Square footage is as follows:

- One bedroom unit—568 sq ft.
- Two bedroom unit—834 sq ft.
- Three bedroom unit—1,040 sq ft.
- Four bedroom unit—1,260 sq. ft.

Seven major contracts for buildings were awarded through competitive bidding and costs average between $5.50 and $6.25 per sq ft.

James L. Stephenson, executive director of the DHA, explained that low bids came in because the huge project was divided into smaller sections of about 500 units apiece.

- **Streets and layout**—The project generally is laid out in a gridwork pattern to achieve maximum cross-ventilation from the prevalent southern breeze in summer, but there are a few curved streets to relieve the straight line effect.

The West Dallas Housing Project will have 10 mi of concrete-paved streets costing $624,617. One street running through the project could be used as a major thoroughfare if future development of West Dallas requires.

- **Other uses**—More than 20 acres of land have been sold to the Dallas Independent School District as the site for junior high school and an elementary school. The area is now served by two large elementary schools.

Policy has not yet been set for commercial construction in the project site. Some land—about 15 acres—is available for stores and even churches, but Stephenson says such buildings would have to be financed privately.

- **Rents and eligibility**—Rents have not yet been established, although rents in other DHA projects range from $12 to $30 a month. The new project will probably be in line with this.

Rents will be determined, not according to the size of the dwelling unit required, but by the financial status of the occupants.

Former site occupants will be given preference.

Eligibility requirements are:

- Family income below $150 a month.
- Family currently living in substandard housing.
- Family head is U. S. citizen.
- Family has lived last six months in Dallas.

BUILDERS OF THE PROJECT

Consultants appointed on the project: John Noyes, St. Louis, Mo., planning; Forrest & Cotton, Dallas, engineering; Smith & Mill, Dallas, architecture. Associated architects are: DeWitt & Swank, Clifford J. Lane, Pettigrew & Worley, J. N. McCammon, Goodwin & Cavitt, Buford & Feinberg and Jack Corgan, all of Dallas.

Contractors working on the project are: J. J. Fritch General Contractor, Inc., Dallas, 590 units; A. J. Rife Construction Company & Associates, Dallas, one section of 500 units and another 510 units; Hubbell-Hubbard Associated Contractors, Houston, one section of 543 units and another of 367 units; Southwest Ball Construction Co., San Antonio, 482 units; and R. F. Ball Construction Co., Inc., Houston, 508 units.

Contractors doing special work are: Interstate Inc., Dallas, demolition; Condon-Cunningham Co., Omaha, Neb., site grading; Marine Construction Company, Inc., Port Lavaca, building foundation; Cullum & Whittle Contractors, Dallas, West Bank interceptor sewer; E. H. Reeder Construction Co., Inc., Dallas, underground utilities; Mid-State Construction Co., Dallas, overhead electrical distribution; Austin Paving Company, Dallas, street paving.

Housing Authority commissioners are Louis Tobian, chairman; W. R. Burns, vice-chairman; Orville Mitchell, Vernon S. Smith and J. W. Simmons, Jr.

Under DHA Director Stephenson are: R. A. Bremer, assistant executive director, and Joe C. Lair, assistant director for development.

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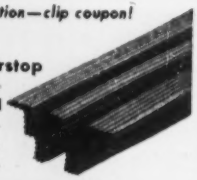

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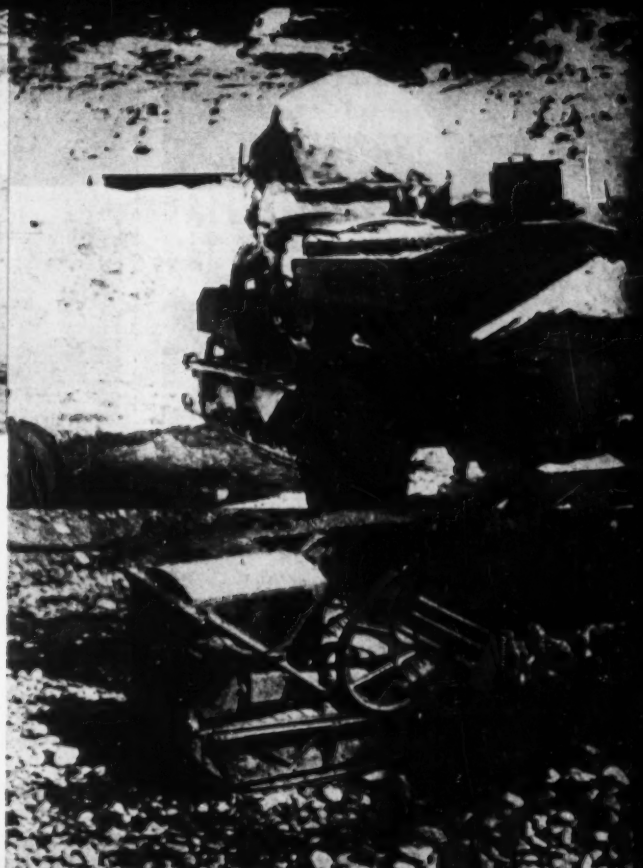

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PROPOSED North Halsted Street Bridge over north branch of Chicago River. New bridge will replace an older bascule bridge.

Bascule bridge planned for Chicago will avoid traffic bottleneck

The familiar sign "Business As Usual," found hanging at renovation or reconstruction jobs, may well be put up by Chicago when it starts to erect a new bascule bridge at Halsted Street over the north branch of the Chicago River, because the new longer and wider bridge will be built over an older one.

The new trusses are longer than the old ones, so the new bridge pits will be located behind the present pits. Also the new bridge is wider than the old one, therefore, it will straddle the present bridge. The new spans will be erected in a fully-opened position (about 30 deg from the vertical) so as not to interfere with the opening and closing of the old bridge.

Stephen Michuda, city bridge engineer, has announced that to avoid a traffic bottleneck similar to that which resulted when replacement of the State Street Bridge was interrupted during the war, the new bridge will be constructed while the old bridge is still in use.

Work on the State Street Bridge was halted from 1939 to 1947 and traffic was detoured for about eight years.

"We are going to erect as much of the superstructure as we can without closing the old bridge to traffic," Michuda explained. We will omit the end floor beam and first panel of flooring at each abutment, to provide 14-ft vertical clearance above the present roadway. We expect to have 80% of the steel in place before we lower the new span and divert traffic."

Michuda said that the new construction will require a couple of years to erect. During this time he believes that traffic will have to be diverted only for two periods of two months each. Construction will start, he said when all the steel is assured for the superstructure.

• **Bascule**—The new bridge, costing an estimated $3.8 million, will be a deck-type, double-leaf trunnion bascule, two truss model. It will be 66-ft wide overall, with a 46-ft roadway for four traffic lanes, and 184 ft long from center to center of the trunnions.

The north leaf will weigh 2,479,200 lb and the south leaf 2,548,000 lb. They will be operated by two 50-hp motors, with an opening or closing time of 48 seconds though a 75-deg angle. Roadways and sidewalks will be constructed of reinforced concrete slab plus concrete wearing surfaces.

The old bridge is a double-leaf, rolling lift, two-truss type. It is 48-ft wide overall and 127 ft long, center to center of the bearings. It has a 31-ft roadway. It cost $114,000 and was opened in January, 1897.

The new bridge is expected to increase traffic capacity and prevent traffic tie-ups at a busy river crossing. The straddle method of construction is not expected to add materially to the cost or the time of construction.

Inter-American sanitary engineering group picks up momentum at congress

The third Inter-American Sanitary Engineering Congress held in Buenos Aires, Argentina, last month proved decisive in so far as the life of the organization was concerned. A necessary integration and stabilization of the group (AIDIS) took place and delegates went away with marked enthusiasm and plans for the progress of public health and sanitation work throughout the hemisphere.

Originally fostered under the aegis of the Pan-American Sanitary Bureau and the Office of Inter-American Affairs (now incorporated under Point 4), the child AIDIS created six years ago had been wobbling along uncertainly and loosely bound. Observers believe that had it not been for resolutions developed in this third congress, the organization would have died on the vine. By the end of the meeting, however, there was a noticeable and definite taking hold, brought about primarily by two resolutions on the administrative level:

- Regular quarterly publication in English and Spanish of the AIDIS Journal will be undertaken by the Mexican branch, thus creating a tie through which pioneering members of the far-flung and loosely knit organization may gain a sense of solidarity and the realization that they are not working alone. (Previously the Journal had been published sporadically by PASB.)
- The decision was made to appoint as executive officers for the succeeding two-year period men from the country which is to play host to the next congress.

Some 100 papers were delivered by delegates. Although they revealed no new technical methods revolutionary in the Western World, they did cover problems indigenous to all countries concerned. High on the list and common to all was the problem of financing sanitary installations. Delegates worked intensively with three commissions (micro-biology–sanitary chemistry, sanitation, and miscellaneous) holding sessions simultaneously over a period of 10 days. Argentina, the host country, was represented by 150 delegates, with 130 coming from 20 other countries all over the hemisphere.

Herman G. Baity, director of environmental sanitation of WHO, and George Pierce, chief sanitary engineer for the Pan-American Sanitary Bureau, headed a 5-member U. S. delegation.

STABILIZATION TALK—Herman G. Baity and George Pierce discuss U. S.-Latin American engineering unity.

All delegates appear to have gone away with enthusiasm and determination to work for safe drinking water and sanitation in all hemisphere countries, and to be able to show progress in the field by the time the 4th Congress convenes in Sao Paulo in 1954.

For the two-year interim just beginning, the following executive officers were elected: President, Lucas Noguera Garces, who is at present governor of the State of Sao Paulo (Garces formerly taught in the Faculty of Engineering at Sao Paulo and has taken active part in this field in his country); vice-president, Wyman Stone of the U. S.; and secretary general, Walter Ribero Sanches, who has worked actively with the Institute of Inter-American Affairs.

Japanese study $1-billion building plan

A seven-part development program that will involve expenditure of a billion U. S. dollars or more, is under study in Japan now by representatives of the World Bank and the Japanese

Japan has applied for a loan from the bank totaling $860 million, of which $318 million is for the construction of dams and power stations on seven rivers and an equal amount for construction of a superhighway to run from Tokyo to Kobe.

Other allotments of funds will include: $50 million for an irrigation government.

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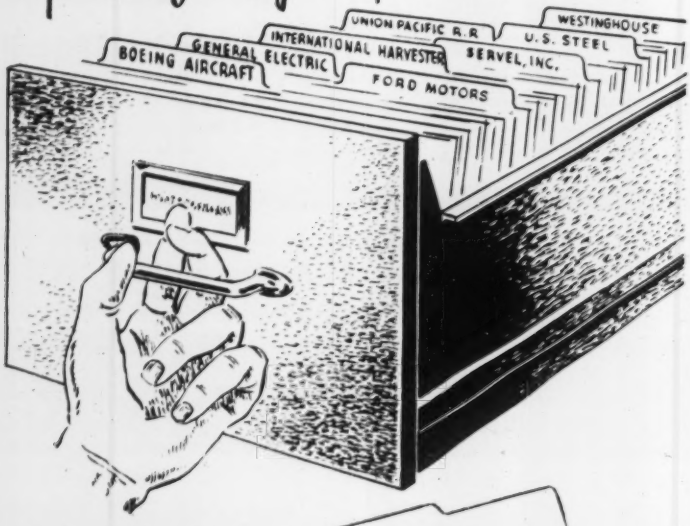

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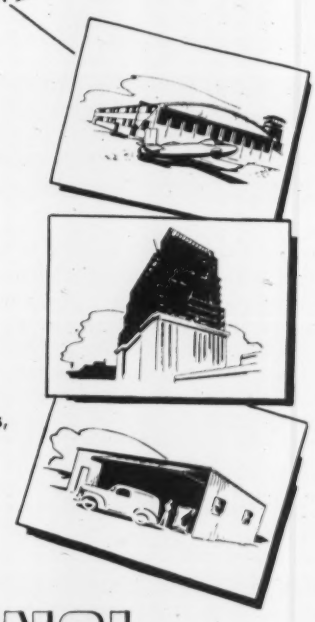

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scheme near Nagoya; $125 million for electrification of major railway lines; $13.8 million for reclamation of land at four ports; $7 million modernization and improvement at five airfields, and $30 million for import of machinery for modernizing steel and coal mining industries.

• **Power needed**—Biggest of the programs will be the power development, to fill a serious shortage in the country's industrial economy. To handle this urgent task, the government recently set up the semi-governmental Electrical Power Sources Development Corporation, and under its sponsorship plans to construct dams and power stations on seven rivers throughout Japan.

The rivers involved will be the Tenryu; the Shokawa; Tadami; Tokachi on the island of Hokkaido; Mimikawa on the island of Kyushu; the Oi; and the Tone, north of Tokyo. All of the dam structures will provide irrigation and domestic water supplies in addition to electric power production.

• **Superhighway plans**—The proposed superhighway from Tokyo to Kobe has long been projected by the Japanese government.

The road will be 300 miles long, providing 66 ft of roadway and will take more than five years for completion. It would cut the present automobile time from Tokyo to Osaka to 5 hours.

Other work planned—The $50-million irrigation scheme in Aichi prefecture would include a dam 390 ft high, 1,410 ft long, and a power station with maximum capacity of 25,000 kw, plus canals with a total length of 235 miles to irrigate 46,100 acres of paddy fields and an additional 3,000 acres of farms.

The 465 miles of railway line from Shiraishi north of Tokyo to Himeji west of Kobe, already double-tracked, would be electrified under another part of the program. At present, only 1,100 miles of the 12,500-mile major railway lines of Japan are electrified. Actual construction of electrification work, including transformers, towers and other appurtenances, would cost a total of $105 million.

Reclamation of land at Kawasaki, Kobe, Sakai and Kokura would add several hundred acres of new land for use as industrial developments at the four ports. The program does not include construction of piers, warehouses and cargo-handling facilities, which would be built at a later date, government sources said.

MALCOLM W. REED, vice president—engineering and raw materials for U. S. Steel, is in charge of the company's vast construction and expansion program.

U. S. Steel spends $1.5 billion for construction and expansion

The man in charge of U. S. Steel's vast construction and expansion program is a mild-spoken engineer who started work for the company in 1916 after graduation from the U. S. Naval Academy. He is silver-haired Malcolm W. Reed, known as "Tom" Reed to everyone in U. S. Steel.

Reed's title is Executive Vice-President—Engineering and Raw Materials. In that position, he administers the facilities planning, engineering, construction and raw materials activities of U. S. Steel.

Here is what he has done:

• U. S. Steel is now in the last stages of an expansion program that boosted its capacity from about 30,000,000 tons a year to around 36,400,000 tons.

• Construction, climaxed by the erection of a completely integrated steel plant at Morrisville, Pa., at a cost of about $450 million, reached its peak in 1952.

• The new Fairless Works at Morrisville, is now about 75% finished. It will be completed during the coming year, and will have an annual capacity of 1,800,000 tons.

• After World War II, the world's biggest steel producing company boosted its steelmaking capacity by 5,000,000 tons in five years. After the outbreak of Korean hostilities, another expansion program was piled on top of work already planned or begun.

• **How U. S. Steel lets contracts**—Whenever a big project is up for construction, The American Bridge Division of U. S. Steel automatically becomes the contractor for steel fabrication and erection.

But other contracts are let competitively:

"Such work is handled on a policy of asking for competitive bids and of making awards of contracts on that basis," explained Reed in an interview in his Pittsburgh office in U. S. Steel's new skyscraper headquarters.

For instance: About 10,000 construction workers were employed at Fairless; if all the subsidiary workers and suppliers are counted, possibly 3,000,000 men and women were and are involved in the construction, many of them employed by the 2,200 contractors. These contractors, in turn, buy materials and services from about 130,000 other enterprises.

"U. S. Steel," Reed said, "is now past the $1-billion mark in expenditures for expansion, replacement and improvement since World War II and there still is some $600 million to spend on programs not completed."

• **Tom Reed**—A native of Lexington, Mass., Reed began working for the

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"$600 MILLION to be spent"

"A LONG LIST of contractors"

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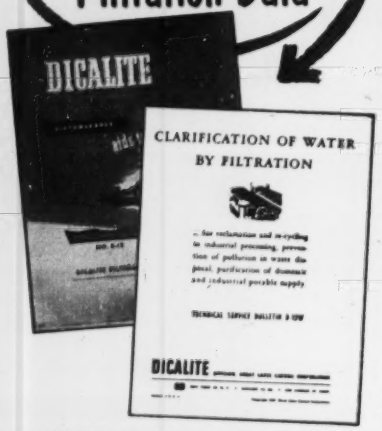

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PRIDE of the seven year expansion program Reed has headed, is the giant $450-million Fairless Works at Morrisville, Pa. (Photos by Purdy)

company in the North Works of American Steel & Wire Co. in Worcester, Mass.

By 1932, he was promoted to chief engineer of American Steel & Wire at Cleveland. In 1937 he became the company's operations vice-president and in 1939 was named chief engineer of Carnegie-Illinois Steel Corp.

Later he was made Vice-President—Engineering, of the company. In 1948 he was made chief engineer of U. S. Steel Corp.

Construction of the Fairless Works has been Reed's biggest job. Plans for the plant had existed long before the Korean War, but the outbreak of hostilities and resulting demand for steel were the signal for starting actual construction.

• **Future expansion**—Here's the expansion and plans picture at U. S. Steel at the turn of the year:

• The Fairless Works will turn out its first finished product some time in the second quarter of 1953.

• The subsidiary, Orinoco Mining Co. is speeding construction work at the Venezuelan "Mountain of Ore" called Cerro Bolivar.

• Rebuilding of coke oven batteries is another big project under way. Four batteries either are finished or next door to completion. Twelve other batteries are in process.

• Plans are now being engineered for construction of a blast furnace at Cleveland. Initial operation target date for this furnace is set for mid-1954.

• At Clairton, Pa., engineering work is being done for construction of new facilities to boost production of Naphthalene. Similar work is being carried out for Gary, Ind., and Fairfield, Ala.

• The subsidiary, Gunnison Homes, Inc., is putting up a new plant at Harrisburg, Pa., to make pre-fabricated all-steel military barracks and other buildings.

• **Spending money**—Here is the year-by-year account of how U. S. Steel spent its expansion and construction money:

At the end of 1945, the company had improvements planned or started which called for spending more than $218 million. During 1946, expenditure of $307 million was authorized. By the end of 1946, $291.6 million was necessary to finish all of the authorized construction and improvements.

Some $220 million was spent in 1947 and the unexpended balance at the close of 1947 had reached $286 million.

At the end of 1948, the estimated cost of finishing projects under way was $143 million more than had been originally set, because of rising costs. At that time U. S. Steel's expansion program had cost a total of $732 million, of which $302.4 million was spent in 1948. There was $249 million yet to be spent on uncompleted projects.

Another chapter of the construction and expansion story was written in 1950, when the company spent $210 million. In 1951 about $681 million was estimated as the amount needed to complete authorized work (including the Fairless Works).

LEGAL

Defects due to faulty plans

The Court of Civil Appeals of Texas, in a recent case,[1] said: "Where a contract does not provide to the contrary, the owner does not warrant that the materials and plans and specifications will produce the building intended by the parties. The builder must decide that question for himself and at his peril and is liable to the owner if the intended building is not produced."

The above statement of law should be taken with caution, as the general rule in most jurisdictions is, as will be seen from the following citations, that a contractor is not responsible for defects resulting from faulty plans and specifications.

"The general rule has become well settled, in practically every American jurisdiction in which the matter has been involved, that a construction contractor who has followed plans and specifications furnished by the contractee, his architect or engineer, and which have proved to be defective or insufficient, will not be responsible to the contractee for loss or damage which results—at least after the work is completed—solely from the defective or insufficient plans or specifications, in the absence of any negligence on the contractor's part, or any express warranty by him as to their being sufficient or free from defects."[2]

"Where the contract specifies what he is to do and the manner and method of doing it, and he does the work specified in the manner specified, his engagement is fulfilled and he remains liable only for defects resulting from improper workmanship or other fault on his part."[3]

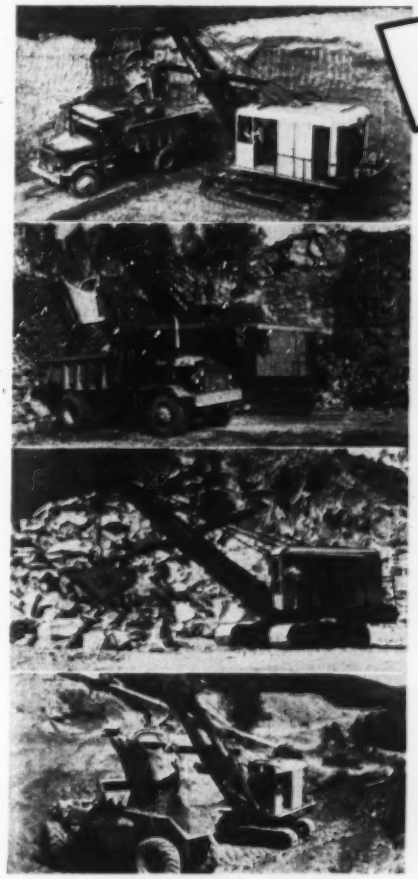
"Where one party furnishes specifications and plans for a contractor to follow in a construction job, he thereby impliedly warrants their sufficiency for the purpose in view."[4]

"There is no liability for defects due to faulty plans or specifications if the builder has been hired to follow them and has done so, unless he has in some manner warranted them."[5]

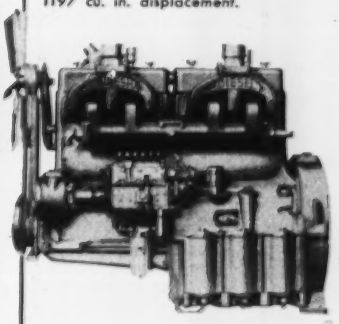
(1) Ruberold Co. v Scott et al., 249 S.W. 2d 256, (May 9, 1952).
(2) Bruton v Sellers & Marquis Roofing Co., 168 S.W. 2d 101.
(3) Friederick v County of Redwood, 153 Minn. 450, 190 N.W. 801.
(4) Montrose Contracting Co. v County of Westchester, 80 F. 2d 841.
(5) Baber v Baessell et al., 85 F. 2d 725.

(These summaries of court decisions are prepared by I. Vernon Werbin, New York attorney and civil engineer.)

WAUKESHA Diesels



6-WAKD WAUKESHA
Super Duty DIESEL
6-cyl., 6¼-in. bore x 6½-in. stroke,
1197 cu. in. displacement.



The patented combustion spherical combustion chamber gives lively, responsive acceleration, shock-free operation, and clean burning for high fuel economy. Get Bulletin 1415.

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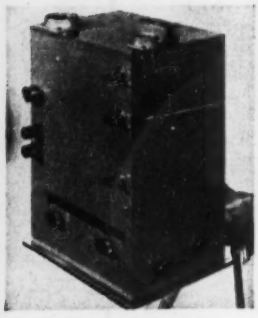
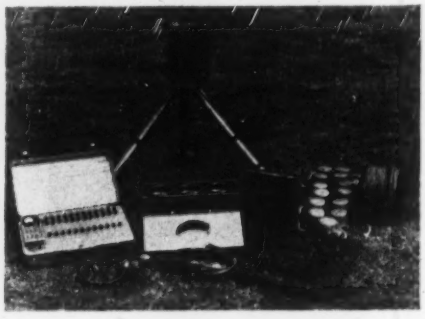
199

LOCATE BEDROCK PROFILES OR CONSOLIDATED LAYERS IN ONE QUICK OPERATION

With Midwestern Refraction Seismograph Equipment bedrock location is easy and economical because one surface shot will give the same information as several drilled sample holes. This Midwestern Portable Equipment is designed and manufactured to the highest engineering standards to give the long trouble-free service and accurate information demanded by competent engineers. This unit is comprised of rugged, dependable, precision instruments which will give true records of subsurface conditions. It will save many expensive hours of time when compared with other methods of bedrock location. For complete information write or wire.

Midwestern Portable Seismograph Equipment is the same in its field as your finest alidade is among surveying instruments. Every instrument is constructed to give the service and high degree of accuracy necessary to meet engineering standards.





MIDWESTERN
GEOPHYSICAL LABORATORY

MIDWESTERN GEOPHYSICAL LABORATORY
3401 S. HARVARD TULSA, OKLAHOMA

OBITUARIES

Robert E. Oberdorf, 60, assistant to the chief engineer of the Nickel Plate Road in Cleveland died at Lakewood, Ohio, Dec. 8. He was a 1915 C.E. graduate of Bucknell University, Lewisburg, Pa. During World War I he served in the Engineer Corps. Mr. Oberdorf began his railroad career in 1916 as an instrumentman at Frankfort, Ind., for the Toledo, St. Louis and Western Railroad, now the Clover Leaf District of the Nickel Plate Road. He later worked as an assistant engineer and chief draftsman there. In 1937 he was named assistant division engineer of the Lake Erie and Western District at Frankfort. In 1947 he was appointed assistant to the chief engineer of the Nickel Plate, at Cleveland.

Joseph Serafini, 41, Binghamton, N. Y., contractor, died Dec. 5. He was a partner in the Serafini Construction Co. Inc. and was a builder of highways and bridges.

William P. Johnson, 65, Erie, Pa., architectural engineer, died Dec. 12. He went to Erie in 1915 as construction engineer for the Erie Works of the General Electric Co., and during his career built many of the city's schools, hospitals, industrial and institutional projects.

Stephen C. Mitchell, 79, for 52 years a civil engineer with the Boston, Mass., Elevated Railway Co., and its successors, the Metropolitan Transit Authority, died at West Roxbury, Mass., Dec. 15. He was graduated in 1898 from Tufts College and retired in 1950.

Charles G. Atkin, 64, president of the Osborn Engineering Co. and the Barber Gas Burner Co., a consulting engineer, died Dec. 5, in Cleveland, Ohio. He attended Union College, Schenectady, N. Y., and was graduated a Bachelor of Engineering. After leaving college he was employed by the State of New York on the Barge Canal and in the State Architect's Office. After his discharge from service in World War I he went to Cleveland as district manager for Lockwood Greene Engineers, Inc., handling the design and supervision of construction of industrial plants. In 1931 he joined the H. K. Ferguson Co. as vice-president. During World War II he was in charge of the design and construction of a shell loading plant and a magnesium plant. In 1943 he became president of Osborn Engineering Co.

Bids Asked—Low Bidders—Contracts Awarded—First Section

Compiled by Business News Department—Engineering News-Record, 330 W. 42nd St., New York 36, N. Y.
ELSIE EAVES, Manager *J. A. MAHONEY, Reports* *M. R. ROESSLER, Statistics*

NEW ENGLAND

BIDS ASKED—HEAVY CONSTRUCTION

† **Mass., Weymouth**—AVIATION GASOLINE FACILITY—B.A. 1/15—Dist. P. Wks. Office, First Naval Dist., 495 Summer St., Boston, rehabilitation of aviation gasoline facility, NOY 75843, Spec. 34895. CD 9/13/51.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

Lind-McLeod, Inc., 1780 Stratford Ave., Stratford, Conn., CA, **$34,415,** site imprvt., South End Junior High School, STRATFORD, CONN. Town Town Hall, Stratford, Conn. CD 12/4, under LB.

BUILDINGS

LOW BIDS AND CONTRACTS

H. Appleby, Yarmouth, Mass. CA Est. **$400,000.** 40 RESIDENCES, FALMOUTH, MASS. Robinaire Estates, Hyannis, Mass.

▲ **Thomas O'Connor Co.,** 238 Main St., Cambridge, Mass. CA Est. **$1,200,000.** BOILER PLANT, Kimball St. Bradford Sect., HAVERHILL, MASS. Robert Grant Co., Inc., 155 E. 44 St., New York, N. Y.

MIDDLE ATLANTIC

BIDS ASKED—HEAVY CONSTRUCTION

† **Md., Annapolis**—B.A. 1/8—P. Wks. Office, U. S. Naval Academy, Annapolis, imprvs. to fresh water supply, U. S. Naval Engineering Experiment Station, Spec. 31639. Plans deposit $15. CD 11/7/47, under Public Buildings.

Pennsylvania—B.A. 1/14—General State Auth., 18 and Herr Sts., Harrisburg, repairing outlet tower and basin and imprvs. at Little Pine Creek Dam, Lycoming Co. $300,000. Plans deposit $10. Gannett, Fleming, Corddry & Carpenter, 600 N. 2 St., Harrisburg, engrs. CD 9/17/51.

† **Pennsylvania**—B.A. About 1/20—U. S. Eng., 24 St. and Maryland Ave., P.O. Box 1715, Baltimore 3, Md., constr. Williamsport Flood Protection Proj., Levee Unit No. 5C at Williamsport, along left (north bank of the West Branch of Susquehanna River and along left (east) bank of Lycoming Creek, Lycoming Co., Serial No. CIVENG 18-020-53-40. Plans deposit $15. CD 4/21/44.

BIDS ASKED—BUILDINGS

† **Md., Edgewood**—ADMINISTRATION, SUPPLY AND LABORATORY—B.A. 1/9—U. S. Eng., 24 St. and Maryland Ave., Baltimore, Zone 18, 1 story, 40x190 ft., 40x167 ft., block walls, steel, T-shaped administration, supply and laboratory bldg., Army Chemical Center, Eng. 18-020-53-39. $500,000. Plans deposit $25. CD 12/15.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

MARYLAND—State Rds. Comn., 108 E. Lexington St., Baltimore, Zone 2,

Wright Constr. Co., Box 1537, Columbus, Ga. CA. **$602,447.** slag, grading, drainage, surf. 0.505 mi. dual hy. Annapolis By-Pass, 2 permanent ramp structures, Contr. AA 263-14-515, Anne Arundel Co. CD 11/18, under LB.

† **Blumenthal Kahn Co.,** 43 S. Liberty St., Baltimore, Md. LB. **$732,000** transmitter facilities, U. S. Naval Radio Station, Spec. 31638, ANNAPOLIS, MD. P. Wks. Office, Naval Gun Factory, Wash., D. C. Bids Dec. 11. CD 11/11.

BUILDINGS

LOW BIDS AND CONTRACTS

Dreier Structural Steel Co., Inc., 32-50 Vernon Blvd., Long Island City, N. Y., LB. **$616,535,** steel for OFFICE, 199 Church St., NEW YORK, N. Y. State Insurance Fund, 625 Madison Ave., New York, N. Y. Bids Nov. 25. CD 11/18.

Kirby & McGuire, 2518 Greenmount Ave., Baltimore, Md. LB. **$379,999.** (second unit). Woodland Beach Elementary SCHOOL, Marley Park, ANNAPOLIS, MD. Anne Arundel Co. Bd. Educ., Annapolis, Md. Rogers & Taliaferro, 229 Prince George St., Annapolis, Md., archts. Jas. Posey & Assoc., 10 E. Pleasant St., Baltimore, Md., mech. engrs. Kubitz & Koenig, Emerson Tower Bldg., Baltimore, Md., struct. engrs.

▲† **John Tester & Son, Inc.,** 1620 Second St. N.W., Wash., D. C. CA, **$1,198,728.** 3 story LABORATORY, INDUSTRIAL BLDG., 5 single brick HOUSES, Naval Research Laboratory, Randall Cliff, CHESAPEAKE BEACH, MD. Dist. P. Wks. Office, Potomac River Naval Command, Naval Gun Factory, Wash., D. C. CD 12/16, under LB.

SOUTH

BIDS ASKED—HEAVY CONSTRUCTION

La., Grand Coteau—B.A. 1/7—Town, WW imprvs. Godeau & Mayne, 168 W. Bellevue St., Opelousas, engrs.

Tenn., Knoxville—STADIUM—B.A. 1/7—City, City Hall, baseball stadium, $500,000. Plans deposit $100. Bid date changed. CD 12/16.

† **Ga., Camp Stewart**—B.A. 1/8—Public Housing Admin., Georgia Savings Bank Bldg., 74 Peachtree St. N. W., Atlanta, grading, water, sewer, paving and electric services for Defence Housing Project GA 1-D-1.

† **Ga., Macon**—HANGAR, etc.—B.A. 1/8—U. S. Eng., 200 E. Julian St., Savannah, hangar with maintenance shop and sup. shop, Robins Air Force Base, Eng 09-133-53-15. Plans deposit $20. Extended date. CD 11/21.

La., Donaldsonville—STADIUM—B.A. 1/8—Ascension Parish School Bd., concrete athletic stadium, $75,000. Plans deposit $15, Bodman & Murrell, 1175 Nicholson Dr., Baton Rouge, archts.

† **North Carolina**—B.A. 1/8—U. S. Eng., 308 Customhouse, Wilmington, maintenance dredging, Wilmington Harbor, CIVENG 31-075-53-12. CD 11/21.

Miss., Yazoo City—B.A. 1/12—City, City Hall, concrete sidewalks.

La., Shreveport—B.A. 1/27—City, City Hall, pave Milton St. from San Jacinto St. to Mertis Ave.

BIDS ASKED—BUILDINGS

Fla., Gainesville—CHURCH—B.A. 1/8—First Presbyterian Church, c/o Sanford W. Goin, Gainesville, church, $325,000.

Miss., Richton—HOUSING—B.A. 1/9—Richton Housing Auth., Richton, housing, Proj. Miss. 67-1 and Miss. 67-2. Plans deposit $50.

† **N. C., Fort Bragg**—BARRACKS—B.A. 1/13—U. S. Eng., 308 Customhouse, Wilmington, enlisted mens barracks and supporting facilities forty-five 225-man barracks, regimental headquarters, motor repair shop, dispatchers office, oil house, gasoline pump house, waterpump station, wash platforms, grease racks, ENG 31-075-53-9. CD 12/26/51.

N. C., New Bern—HOUSING—B.A. 1/14—New Bern Housing Auth., W. Floyd Gaskins, chn., Trent Court, N. C. 5-4, 108 units, 18 bldgs. and maint. bldg., housing. Plans deposit $50. John J. Rowland, Kinston, N. C., archt.

Ga., Atlanta—PARKING GARAGE—B.A. 1/15—Williams Bros., c/o Aeck Assocs., archts., 140 Peachtree St. N. E., auto parking garage, $100,000. Plans deposit $50.

S. C., Charleston—HIGH SCHOOL—B.A. 1/21—Charleston School Dist. 20, Court House, Burke High School addn. $400,000. Plans deposit $50. Augustus E. Constantine, 139 Calhoun St., archt. CD 6/16.

PROJECTS COVERED

Projects—By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger: water supply, earthwork, waterways $34,000; other public works $60,000; industrial buildings $82,000; other buildings $300,000.

Classes of Construction

(Name in order of Listing)

Water Supply	Latin America
Sewers, Waste Disposal	Public Buildings
Bridges	Commercial Buildings
Streets & Roads	Industrial Buildings
Earthwork, Waterways	Unclassified

Stages Reported

PROPOSED WORK: Including appointment of engineers or architects.

BIDS ASKED (new announcements only). For full calendar, see also preceding issues of ENR.

LOW BIDDERS: On jobs below $500,000 value all low bidder news will be the final reports published on the projects inviolved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.

CONTRACTS AWARDED: Except awards to low bidders previously reported in low bidder stage.

Dates shown are of issue in which last previous report was published.

Symbols and Abbreviations Include:

†	Federal Government
▲	Project of $1,000,000 or over.
B.A.	Bids Asked
ENR	Engineering News-Record
CD	Engineering News-Record Construction Daily

SOON LETS CONTRACT—BUILDINGS

Tenn., Memphis—GARAGE—Goldsmith's, Front St., soon lets contract auto parking garage. $750,000. E. L. Harrison, 81 Madison Bldg., archt. CD 12/12.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

NORTH CAROLINA—State Hy. & P. Wks. Comn., Raleigh, **Sanford Constr. Co.,** Box 427, Sanford, N. C. LB **$424,322,** est. $400,000-$500,000, structures on U. S. 258 between intersection of U.S. 258 and U.S. 70 and Kinston, Proj. 2627, F-250 (8), Lenoir Co. Bids Dec. 16. CD 12/5.

NORTH CAROLINA—State Hy. & P. Wks. Comn., Raleigh,

F. D. Cline Paving Co., Box 329, Raleigh, N. C. LB **$92,329,** est. $75,000-$100,000. STBC and b. conc. binder and surf. 3.31 mi. from point on U. S. 15-a, approx. 3.4 mi. southwest of Blounts Creek, Fayetteville City limits northeast to point on N. C. 87, approx. 1.8 mi. northwest of Fayetteville city limits, Proj. 3-251. A.S. 141 (3), Cumberland Co.;

Wilson Constr. Co., Inc., Box 603, Salisbury, N. C., LB **$127,850,** est. $125,000-$150,000, grading, structures 2.6 mi. U.S. 52 from point approx. 5.3 mi. north of Wadesboro, north to point approx. 0.8 mi. south of Ansonville, Proj. 6074. S F. 229 (8), Anson Co.;

W. E. Graham & Sons, Cleveland, N. C., LB **$234,459,** est. $60,000, grading 9 mi. addnl. lane of U. S. 29 from end of four lane pavement north of Concord to point near the junction of N. C. 152 at China Grove, Proj. 6159. Cabarrus and Rowan Counties;

E. B. Towles Constr. Co., Inc., Market St. Rd., Wilmington, N. C., LB **$90,616,** est. $100,000-$125,000, sand asph. or b. conc. base and surf. 16.9 mi. from junction U. S. 17 at Bishop to junction U. S. 74 and 76 at Maco, from junction U.-S. 74 and 76 at Leland to Navassa, from junction U. S. 74 and 76 at Delco, southward 1.9 mi. from junction, N. C. 87 approx. 2 mi. northwest of Acem to Armour, Proj. 3-9-28-233, 3-9-29-234, Brunswick and Columbus Counties, Bids Dec. 16. CD 12/5.

Marlboro Electric Co-operative, Bennettsville, S. C. Owner Builds. **$200,000.** 75 mi. rural distr. lines, Marlboro Co., SOUTH CAROLINA. CD 6/30/49.

Horry Telephone Co-operative, Conway, S. C. Owner Builds. $500,000. telephone lines, CONWAY, S. C.

R. D. Cole Mfg. Co., Newnan, Ga., CA. **$107,000,** 500,000 gal. elevated steel water storage tank, GAFFNEY, S. C. City, Gaffney, S. C. Bids Dec. 10. CD 12/5.

▲ **GEORGIA**—State Hy. Dpt., Atlanta,

Seaboard Constr. Co., P. O. Box 558 Brunswick, Ga., CA, **$1,258,617,** grading, paving, Turtle River Bridge approaches 3.177 mi. on Brunswick, Georgia-Jacksonville, Fla. Rd. beginning at north end of Turtle River bridge and extending north to S.C.L. R.R. Spur on State Rt. 25 and incl. connections to Fourth Ave., Gloucester St. and St. Simons Island Causeway, incl. paving Lanier Blvd. between 4 and Elm Aves. Bids Dec. 12, awarded Dec. 16. CD 12/16 under LB.

▲† **Ed L. Powers Contg. Co.,** Jesup, Ga., CA, **$1,170,288** addnl. site facilities, Eng 09-253-53-14, CAMP STEWART, GA. U. S. Eng., 200 E. Julian St., Savannah, Ga. Bids Dec. 11. CD 11/10.

† **Coite Somers Constr. Co.,** Vidalia, Ga., CA, **$572,556** warehouse and heating plant, Hunter Air Force Base, Inv. 5321, SAVANNAH, GA. U. S. Eng., 200 E. Julian St., Savannah, Ga. Bids Dec. 11. CD 11/20.

† **J. A. Laporte, Inc.,** 1101 Wilson Blvd., Arlington, Va., LB, **$281,400,** enlarging existing channel, intracoastal Waterway from Haulover to Cocoa, Brevard Co., CIVENG 08-123-53-17, FLORIDA. U. S. Eng., P. O. Box 4970, Jacksonville, Fla. Bids Dec. 5. CD 12/8.

Central Florida Electric Co-operative, Chiefland, Fla., Owner Builds. **$140,000,** 71 mi. rural distr. lines, Levy Co., FLORIDA. CD 12/10.

H. J. High, 1015 Amelia Ave., Orlando, Fla., CA, **$67,747,** Fairview Park Imprvs., ORLANDO, FLA. City, City Hall, Orlando, Fla.

▲† **Warren Bros. Roads Co.,** 400 S. 41 St., Birmingham, Ala. CA **$1,383,000.** 150,000 squares concrete mattress at Greenville Casting Field, Greenville, MISSISSIPPI. U. S. Eng., P. O. Box 60, Vicksburg, Miss. CD 12/12, under LB.

Taylorsville Constr. Co., Taylorsville, Miss. CA **$101,883.** grading, paving 8.816 mi. county road between Basin and Agricola, LUCEDALE, MISS. Bd. Supervs. George Co., Lucedale, Miss. Bids Dec. 12.

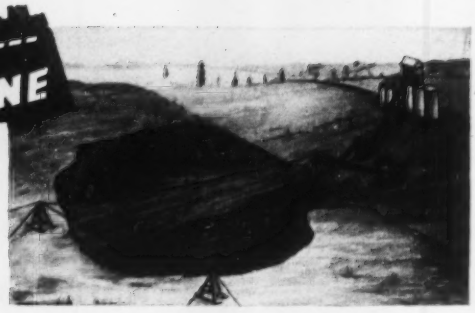
† **Fordice Constr. Co.,** Porter Bldg., Memphis, Tenn. CA $793,600. 80,000 squares concrete mattress, Delta:

T. L. James & Co., Ruston, La. CA **$654,500.** 70,000 squares concrete mattress, Vidalia, LOUISIANA. U. S. Eng., P. O. Box 60, Vicksburg, Miss. CD 12/12, under LB.

Barber Brothers Co., 2636 Dougherty Dr., Baton Rouge, La. CA **$80,838.** pave 8 city streets, BATON ROUGE, LA. City, City Hall, Baton Rouge, La. Bids Dec. 4. CD 6/29/50.

L. W. Eaton Co., P. O. Box 387, Baton Rouge, La. LB **$161,956.** swimming pool in Howell Park, BATON

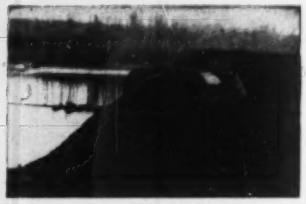
ONE MAN—ONE MACHINE



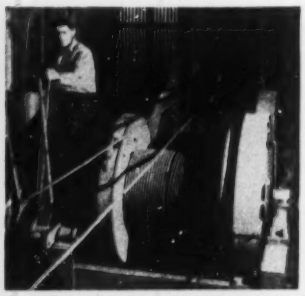
VERSATILE
EFFICIENT
ECONOMICAL

Picture shows how a Sauerman Drag Scraper equipped for rapid shifting makes fast work of cutting down a large hill of hard-packed gravel.

SAUERMAN SCRAPER



In far northern Alberta, Canada, valuable tar sands, dense and sticky, are dug from a river bluff by 1 cu. yd. Sauerman scraper, which drags the material to a loading ramp.



Operation of a Sauerman Scraper machine is an easy one-man job because of the smooth running Sauerman roller bearing scraper hoist.

VERSATILE: The Sauerman Power Drag Scraper can be readily set up for almost any dig-and-haul job. The material may be hard-packed, wet or sticky—the haul may be one hundred feet or many hundred feet—the flexible Sauerman Scraper always seems equal to the task. Only one man is required to dig, haul, stockpile or load in one continuous cycle. Bucket sizes 1/3- to 15-cu. yds.

EFFICIENT: Finger-tip controlled from a safe, comfortable operating station, the scraper is easily guided over a large area. The unique bottomless Crescent scraper readily penetrates hard materials, gathers a full load, hauls to the discharge point, and dumps cleanly. Depending on the length of the span, 20 to more than 40 loads can be moved per hour.

ECONOMICAL: Labor and equipment is reduced to a minimum by using the Sauerman Scraper. Installation is moderate in cost. Simplicity of design, plus the fact that only the most expendable parts come in contact with the material handled, results in low maintenance expense. Gasoline, diesel, or electric power consumption is light.

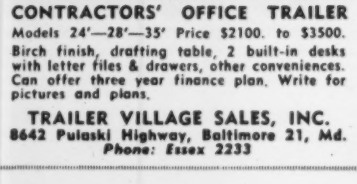
For complete facts, write or wire for Sauerman Catalog A

SAUERMAN BROS., Inc.

532 S. Clinton St. Chicago 7, Ill.

Cableway and Scraper Specialists Since 1909

Would you use 1925 construction equipment today? No. Why not change over and equip your jobs with modern office trailers and cut costs.



CONTRACTORS' OFFICE TRAILER

Models 24'—28'—35' Price $2100. to $3500. Birch finish, drafting table, 2 built-in desks with letter files & drawers, other conveniences. Can offer three year finance plan. Write for pictures and plans.

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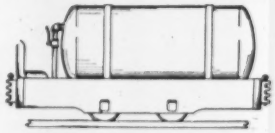
AIR LOCOMOTIVE for Tunnel Haulage



Operates at 100 p.s.i. pressures. May be recharged at any Air Valve. Prices for 24" gage factory (fob) begin at **$1600**

MAYO TUNNEL & MINE EQUIPMENT LANCASTER, PA.

ROUGE, La. Recreation & Park Comn. of East Baton Rouge Parish, 115 St. Louis St., Baton Rouge, La. Bids Dec. 12. CD 11/28.

Flenniken Constr. Co., Inc., 3820 Florence Ave., Shreveport, La. CA $115,310. concrete paving slabs and tracks for Lake Charles Docks, LAKE CHARLES, LA. Lake Charles Harbor & Terminal Dist., Lake Charles, La. Bids Dec. 10. CD 12/8.

T. L. James & Co., Ruston, La. CA $68,751. c.conc. paving, NEW IBERIA, LA. Iberia Parish Police Jury, New Iberia, La. Bids Dec. 11. CD 11/25.

Boh Bros. Constr. Co., 2400 Cypress St., New Orleans, La. CA $107,792. concrete, asph. street paving under Proposal 3302, NEW ORLEANS, LA. City, City Hall, New Orleans, La. Bids Dec. 12. CD 5/3/51.

† **W. L. Hailey & Co.**, 314 42nd Ave. N., Nashville, Tenn., LB $357,272. First Stage, excavation for Cheatham Dam Power Plant on Cumberland River, 23 mi. from Clarksville, Serial No. CIVENG 40-058-53-21, TENNESSEE. U. S. Eng., 303 Federal Office Bldg., Nashville 1, Tenn. Bids Dec. 9. CD 11/10.

▲† **The Weymouth Constr. Co.**, 2174 Person St., Memphis, Tenn., CA. $1,451,520, est. $1,443,120, casting 168,000 mattress units in a field at Richardson Landing approx. 35 mi. up the Mississippi River from Memphis, Tenn.; CA $1,380,000, est. $1,374,360, casting 156 mattress units at Helena Ark., CIVENG 40-041-53-69, TENNESSEE and ARKANSAS. U. S. Eng., P. O. Box 97, Memphis 1, Tenn. Bids Dec. 2, CD 12/12, under LB.

TENNESSEE—State Hy. Dpt., Nashville,

A. B. Burton Co., Lynchburg, Va., CA $768,376, crushed stone surf. and constr. 7 bridges 7.17 mi. State 73 between Gatlinburg and Cosby from near Little Pigeon River and extending to near Cocke Co. line, Sevier Co. Bids Dec. 5. CD 12/12, under LB.

C. F. W. Constr. Co., Fayetteville, Tenn., CA $115,400. water filter plant addns., MADISON, TENN. Madison Suburban Utility Dist., Madison, Tenn. Bids Dec. 11. CD 11/24.

BUILDINGS

LOW BIDS AND CONTRACTS

Thomas J. Broyhill Co., Inc., 2049 15th St. N., Arlington, Va. Owner Builds. $750,000, 90 room HOTEL, Arlington Blvd. and Pershing Dr., ARLINGTON, VA. John M. Walton & Assoc., 2049 15th St. N., Arlington, Va., archts.

Triangle Development & Sales Co., 205 E. Bland St., Charlotte, N. C. Owner Builds. $500,000. Third Sect. Nation Ford HOMES, CHARLOTTE, N. C.

Charlotte Lumber & Mfg. Co., 2914 Camden Rd., Charlotte, N. C. Owner Builds. $250,000. PLANT, Griffith St., CHARLOTTE, N. C. CD 9/5.

Harper Builders Supply Co., Williamston, S. C., CA. $544,000. 75 HOUSING units, EDGEFIELD and BELTON, S. C. South Carolina Regional Housing Auth. No. 1, Laurens, S. C. Bids Dec. 11. CD 12/16, under LB.

Fiske-Carter Constr. Co., Box 1251, Spartanburg, S. C. CA. $594,000. 80 HOUSING units, INMAN, JONESVILLE and LANDRUM, S. C. South Carolina Regional Housing Auth. No. 1, Laurens, S. C. Bids Dec. 10. CD 12/15, under LB.

Cleveland Electric Co., Inc., 1800 Kings Ave., Jacksonville, Fla., CA. $457,000, electric wiring sys. for Urquhart Electric PLANT, NORTH AUGUSTA, S. C. South Carolina Electric & Gas Co., 1321 Main St., Columbia, S. C. CD 11/29/51.

Wm. B. Dillard, Sylvan, N. C., CA. $526,000, combination elementary-high SCHOOL, CLEVELAND, GA. White Co. Bd. Educ., Cleveland, Ga. CD 12/8, under LB.

Swift Mfg. Co., 15 St. and 7 Ave., Columbus, Ga., Owner Builds. $159,000. PLANT addn., COLUMBUS, GA.

Eelbech Milling Co., 600 Fifth Ave., Columbus, Ga., Owner Builds. $100,000, grain storage WAREHOUSE, COLUMBUS, GA.

R. H. Wright & Son, 1050 N.E. 5 Terrace, Ft. Lauderdale, Fla. Owner Builds. $100,000. mfg. PLANT, FT. LAUDERDALE, FLA.

H. W. Ivey Constr. Co., 3181 Peachtree Rd. N.E., Atlanta, Ga. CA. $463,733, HOUSING, Projects GA 137-1 and GA 137-2, HAZLEHURST, GA., Hazlehurst Housing Auth., Hazlehurst, Ga. Bids Dec. 16. CD 11/20.

Gas Engineering Co., Daytona Beach, Fla., Owner Builds. $100,000 PLANT, HOLLY HILL, FLA. CD 12/5.

Eli Friedman, 2360 S. W. 2 St., Miami, Fla., Owner Builds. $95,000, WAREHOUSE, MIAMI, FLA.

Ridge Home Builders, Mulberry, Fla. Owner Builds. $400,000. 40 RESIDENCES, MULBERRY, FLA.

James D. Picken, 2901 Coral Way, Miami, Fla. Owner Builds. $370,000, 46 RESIDENCES, MIAMI, FLA.

Ben Greenberg, 1200 Crooms St., Orlando, Fla. Owner Builds. $350,000. 50 RESIDENCES, ORLANDO, FLA.

Home Builders Supply, Ellamae St., Tampa, Fla. Owner Builds. $100,000. PLANT addn., TAMPA, FLA. CD 12/2.

Garapic, Kausek & Lorbach, Winter Park, Fla., Owner Builds. $375,000. SHOPPING CENTER, WINTER PARK, FLA.

Camp Hill Industries, Camp Hill, Ala., Owner Builds. $85,000. PLANT addns., CAMP HILL, ALA.

Hedstrom Union Co., Dothan, Ala. Owner Builds. $200,000. PLANT addn., DOTHAN, ALA.

L. B. Priester & Son, 1403 12 Ave., Meridian, Miss. CA. $870,117. HIGH SCHOOL, GREENVILLE, MISS. Greenville Municipal Separate School Dist., Greenville, Miss. CD 11/28, under LB.

Davis & O'Neal, Gulfport, Miss. Owner Builds. $450,000. 30 RESIDENCES, GULFPORT, MISS.

Dixie Builders & Supply Co., Raleigh, Miss. CA $70,500. POWER PLANT structures, YAZOO CITY, MISS. Bd. Supervs. George Co., Yazoo City, Miss. Bids Dec. 10. CD 12/2.

▲ **The Austin Co.**, 16112 Euclid St., Cleveland, O. CA. Est. $1,000,000. PLANT, LOUISVILLE, KY. American Air Filter Co., Central Ave., Louisville, Ky. CD 12/9.

A. J. Eline, Sr., 4010 Frankfort St., Louisville, Ky. Owner Builds. $500,000. 26 RESIDENCES, LOUISVILLE, KY.

Dartmoor Development Co., 4505 Chaswood St., Memphis, Tenn. Owner Builds. $500,000. 22 RESIDENCES, MEMPHIS, TENN.

MIDDLE WEST

BIDS ASKED—HEAVY CONSTRUCTION

† **Illinois**—B.A. 1/8—U. S. Eng., 420 Locust St., St. Louis, 2, Mo., approx. 300 relief wells complete with screen, filter pack, riser and outlet pipes, performing pumping test at each cell and furnishing, installing 66 piezometer tubes complete with well points in Columbia Drainage and Levee Dist. and Prairie du Rocher and vicinity, Monroe and Randolph Counties, Civeng 23-065-53-83. CD 12/8.

† **Ind., Vincennes**—B.A. 1/15—U. S. Eng., 830 W. Broadway, Louisville, 3, Ky., flood protection works, Section A, Part 2, Serial No. Civeng 15-029-53-59. Plans deposit $15.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

F. & Y. Building Service, Inc., 328 E. Town St., Columbus, O., LB $127,633, est. $125,000. cross-shaped, concrete block, stone. Arthur Johnson Memorial Aquarium at Columbus Zoo, COLUMBUS, O. City, Elmer A. Keller, service dir., City Hall, 90 W. Broad St., Columbus, O. Bids Dec. 9. CD 2/11/52.

BUILDINGS

LOW BIDS AND CONTRACTS

Paul Cripe Bldg. Co., Lemcke Bldg., Indianapolis, Ind., Owner Builds, $550,000 50 HOMES, INDIANAPOLIS, IND.

Cecil K. Crispin, Chrisman, Ill., CA, general contract; **W. Troy Doty**, Benton, Ill., CA, plumbing and heating; **Harrisburg Electric Co.**, Harrisburg, Ill., CA, electrical work, High SCHOOL addns., alterations, CARMI, ILL. Total est. $737,281, Carmi Township High School Dist., Carmi, Ill.

Fairbanks-Morse & Co., 217 S. 8 St., St. Louis, 2, Mo., CA, $143,730, municipal POWER PLANT imprvs., incl. diesel engine generating units, 975 kw to 1200 kw, auxiliaries, equipment, foundations, building rehabilitation and appurtenances thereto RED BUD, ILL. City, Conrad F. Becker, mayor, Red Bud, Ill. Bids Nov. 3. CD 10/3.

WEST OF MISSISSIPPI

BIDS ASKED—HEAVY CONSTRUCTION

Tex., Orange—B.A. 1/13—Orange County Housing Auth., 703 Second St., Water supply wells, one each at Bridge City, Cove Vidor. $45,000. Matkin & Fitch, 4101 San Jacinto St., Houston, engrs. CD 12/10, under LB.

† **S. D., Rapid City**—BARRACKS, etc.—B.A. 1/16—U. S. Eng., 1709 Jackson St., Omaha, Neb., SAC barracks and mess bldg. at Rapid City Air Force Base, Inv. 25-066-53-117. CD 11/12/51.

† **New Mexico**—B.A. 1/20—Bureau Reclamation, Dpt. Interior, Bldg. 53, Denver Federal Center, Denver, Colo., dams and dike for reservoir rehabilitation, Vermejo Proj., 5 mi. northwest of Maxwell, Spec. DC 3860; adv. ENR 1/3. CD 11/12/51.

† **Kansas**—B.A. 1/22—Bureau Reclamation, Dpt. Interior, Kirwin, earthwork, structures, track relocation of Missouri Pacific R. R., Kirwin Dam, Missouri River Basin Proj., Spec. DC 3861; adv. ENR 1/1. CD 11/12/51.

Ark., Green Forest—B.A. 1/24—City, City Hall, sanitary sewer imprvs, $100,000. Dickinson & White, 115½ N. Spring St., Little Rock, Ark., engrs. CD 11/26/45.

▲ **Ark., Little Rock**—B.A. 1/30—Little Rock Waterworks Bd., City Hall, water line from reservoir to filter plant, $1,000,000. CD 6/25.

† **North Dakota**—B.A. 2/3—U. S. Eng., Fort Lincoln, P. O. Box 300, Bismarck, powerhouse and switchyard for Garrison Dam and Reservoir Proj., Mercer Co., Inv. 32-015-53-19. CD 12/2.

▲ **Texas**—GAS LINE, etc.—Bids Asked—Wilcox Trend Gathering System, Oil & Gas Bldg., Dallas, 167 mi. natural gas line between area of Provident City (Colorado Co.) and Tilden area (McMillen Co.), $10,500,000; booster stations, Provident City area, $225,000; Tilden area, $250,000; Cuero area, $175,000. CD 6/4.

BIDS ASKED—BUILDINGS

▲ **Mo., Mexico**—HOSPITAL—B.A. 1/7—Audrain Co., Court House, 3 story, bsmnt., brick, concrete, steel county hospital addn. $1,000,000. O. W. Stiegemeyer, 452 S. Price Rd., Ladue 24, Mo., archt. CD 12/18/51.

Tex., Georgetown—SCIENCE—B.A. 1/22—Southwestern University, Georgetown, 31,000 sq. ft. fondren science. $475,000. Walter P. Moore, 4605 Montrose St., Houston, archt. Cameron D. Fairchild & Assoc., 2626 Westheimer Rd., Houston, engrs. CD 8/27/51.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

† **Pacific Oerlikon Co.**, 3001 N. Starr St., Tacoma, Wash., CA. $85,436, Schedules 2 and 3, two 115,000-volt, two 46,000-volt, two 34,500-volt, and two 14,400-volt circuit breakers with spare parts for Brookings, Armour, Woonsocket, Flandreau and Winner substations, Missouri River Basin Proj., Spec. 600S-108, SOUTH DAKOTA. Bureau Reclamation, Dpt. Interior,

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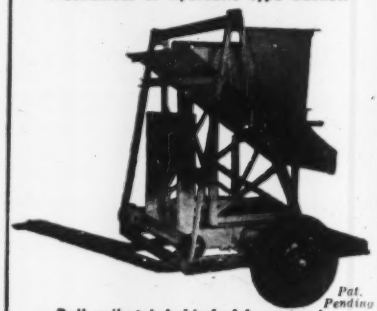

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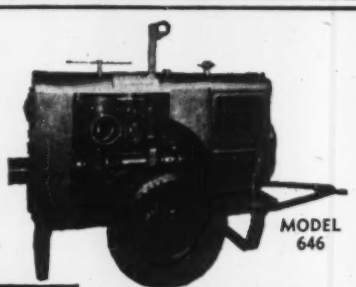

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Billings, Mont. Bids Nov. 6, awarded Dec. 5.

† **Bales & Kite**, 112 E. 10 St., Kansas City, Mo. LB. $458,935. restoration of toe and bank protection Central Industrial Dist. Kansas Sect. Kansas City's Flood Protection Proj. at Missouri and Kansas Rivers, Inv. 23-028-53-92, KANSAS. U. S. Eng., 601 Davidson Bldg., Kansas City 8, Mo. Bids Nov. 26. CD 4/21/44.

† **U. S. Eng.**, 601 Davidson Bldg., Kansas City 8, Mo. rejected bids Dec. 12, airfield lighting at Forbes Air Force Base, Inv. 23-028-53-45, TOPEKA, KAN. LB. $104,009. Will re-advertise. CD 12/2.

City, Pasadena, Tex., Own Forces. $63,150, sanitary sewer lines, PASADENA, TEX. George S. Smith, city engr. CD 9/24/48.

City, Pasadena, Tex., Own Forces, $90,000, some addnl. asph. type street paving, PASADENA, TEX. George S. Smith, city engr. CD 1/9/50.

† **Bares Co., Inc.**, 205 N. 2 St., Albuquerque, N. M. CA. $62,990, constr. residence, garage, pump house, lubricant bldg. and combination office, warehouse and shop, drives and walks, water, sewer and gas systems for Maintenance Headquarters at San Marcial, Middle Rio Grande Proj., Spec. 500C-28, NEW MEXICO. Bureau Reclamation, Dpt. Interior, Albuquerque, N. M. Bids Oct. 23, awarded Dec. 3. CD 10/1.

BUILDINGS

LOW BIDS AND CONTRACTS

Glenn Stinson, 1 Jaccard Lane, St. Louis 24, Mo. CA Est. $225,000. 1 story, 30,000 sq. ft. FACTORY, Industrial Drive west of Hanley Rd., BRENTWOOD (ST. LOUIS 17 P.O.), MO. Proctor Counter Co., 2121 N. 9 St., St. Louis 6, Mo. O. Stiegemeyer, 452 S. Price Rd., Ladue 24, Mo., archt.

Hiram Elliott Constr. Co., 922 Walnut St., Kansas City, Mo. CA $202,470. PLANT, NORTH KANSAS CITY, MO. Modern Handcraft, Inc., 24 and Burlington Sts., North Kansas City, Mo. Cooper, Robinson & Carlson, Commerce Trust Bldg., Kansas City, Mo., archts.

L. O. Stocker Co., 3928 Lindell Blvd., St. Louis 8, Mo. CA Est. $800,000. 300x300 ft., steel, concrete, masonry assembly PLANT on Rock Island R.R. adjacent to Price and Olive Street Rds., OLIVETTE, MO. Carter Carburetor Corp., 2840 N. Spring Ave., St. Louis 7, Mo. Sverdrup & Parcel, Inc., 915 Olive St., St. Louis 1, Mo., engr. CD 9/18.

H. B. Deal & Co., Inc., 5517 Manchester Ave., St. Louis 10, Mo. CA 60x120 ft., 20x100 ft. top addn. to FACTORY and connecting passages to bldg., 5101 Farlin Ave., ST. LOUIS, MO. General Cable Corp., 5043 Farlin Ave., St. Louis 15, Mo. J. John Hoener & Assoc., 4606 Beck Ave., St. Louis 16, Mo., archts.

Murch-Jarvis Co., Inc., 718 Locust St., St. Louis 1, Mo. CA Est. $125,000. 1 story, 70x268 ft. freight TERMINAL and OFFICE, 250 E. Prairie Ave., ST. LOUIS, MO. Transportation Realty Corp., 512 S. 6 St., St. Louis 2, Mo. H. T. Jarvis, 15 Holly Dr., Webster Groves 19, Mo., engr.

▲ **Arkansas Louisiana Gas Co.**, Slattery Bldg., Shreveport, La., Owner Builds, $2,000,000, gas COMPRESSOR STATION, ARKADELPHIA, ARK. CD 11/26.

Munsingwear, Inc., Rogers, Ark., Owner Builds, $85,000 PLANT, BENTONVILLE, ARK.

Frolic Footwear, Inc., Jonesboro, Ark., Owner Builds, $100,000 PLANT addn., JONESBORO, ARK.

Elan & Ness, Fergus Falls, Minn., LB $329,662, general contract remodel and constr. 3 story bsmnt., 62x202 ft. SCHOOL addn., HANKINSON, N. D. St. Francis Academy, Sister M. Dorothea, principal, Hankinson, N. D. F. W. Jackson & Assoc., St. Cloud, Minn., archts. Bids Nov. 25.

† **C. H. Leavell & Co.**, 1900 Wyoming St., El Paso, Tex. LB $291,112, SHOP bldgs., and field PRINTING PLANT. Inv. No. Eng 29-005-53-45, Fort Bliss, EL PASO, TEX. U. S. Eng., Box 1538, Albuquerque, N. M. Bids Dec. 11. CD 11/13.

Crown Central Petroleum Corp., Pasadena, Tex., Purchases, Day Labor. $545,863, petroleum REFINERY Imprvs. and expansion, PASADENA, TEX. CD 4/9/51.

FAR WEST

BIDS ASKED—HEAVY CONSTRUCTION

† **Idaho, Mountain Home**—MESS HALL—B.A. 1/22—U. S. Eng., City and County Airport, Walla Walla, Wash., officers mess hall, Mountain Home Air Force Base, ENG 45-165-53-27. CD 9/18/51.

† **Oregon**—B.A. 1/22—U. S. Eng., Bldg. 602, City-County Airport, Walla Walla, Wash., furnish, install temporary closure wall, McNary Dam powerhouse, McNary Dam, Serial No. CIVENG 45-164-53-61.

BIDS ASKED—BUILDINGS

Wash., Winlock—PLANT—Bids Asked—Perma Products Co., Winlock, 180x380 ft. wood-products plant, $150,000 Wohleb & Wohleb & Assocs, 715 S. Washington St., Olympia, archts. CD 10/16.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲† **S. A. Healy Co.**, 20 N. Wacker Dr., Chicago, Ill., CA, $6,798,101, earthwork, pipe line and structures for San Jacinto-San Vicente Aqueduct North Station 1968 plus 15 to South Station. 34 plus 26, San Jacinto-San Vicente Aqueduct, San Diego, Proj. Spec. 3822, CALIFORNIA. Bureau Reclamation, Dpt. interior, P. Wks. Office, Eleventh Naval Dist., 1220 Pacific Hy., San Diego, Calif. Bids Nov. 20. CD 11/28, under LB.

† **John C. Schreck & Son**, 2536 27 St., Sacramento, Calif., LB, $184,325, bachelor officers' quarters at Mather Air Force Base, Spec. 1620, SACRAMENTO, CALIF. U. S. Eng., Wright Bldg. Sacramento, Calif. Bids Dec. 11.

Associated Engineers, 3606 E. Camino Real, Palo Alto, Calif., LB, $43,090; Sch. A, c.i. pipe;

L. E. Webb Constr. Co., P. O. Box 705, Santa Maria, Calif., LB, $38,694, Sch. B, asbestos-cement pipe; water mains, SOLVANG, CALIF. Solvang Municipal Improvement Dist., Solvang, Calif.

BUILDINGS
LOW BIDS AND CONTRACTS

Andersen & Westfall, 2470 N. W. Nicolai St., Portland, Ore., CA. $500,000. 2-block concrete WAREHOUSE, PORTLAND,ORE. Bitar Bros., 0234 S. W. Bancroft St., Portland, Ore. John Jensen, 2318 S. W. 6th St., Portland, Ore., archt. Awarded Dec. 14.

▲ **J. A. McNeil Co., Inc.**, 3115 W. Mission Rd., Alhambra, Calif., Lb, $1,448,000, 4 story, steel, rein-con. Freeman Memorial HOSPITAL, INGLEWOOD, CALIF. Sisters of St. Joseph of Carondelet, c/o Albert C. Martin & Assocs., archts., 333 S. Beaudry St., Los Angeles, Calif. Bids Dec. 11. CD 11/28.

CANADA

BIDS ASKED—BUILDINGS

Man., St. Boniface—RESIDENCE—B.A. 1/8—St. Boniface Hospital Expansion & Building Fund, St. Boniface Hospital, 5 story, brick nurses residence addn. Green, Blankstein & Russell, Time Bldg., Winnipeg, archts.

HEAVY CONSTRUCTION
LOW BIDS AND CONTRACTS

E. Monette Ltd., 2190 Blvd. Gouin, Montreal, Que., CA, $47,000, 4 and 6 in. water mains in various streets, RIVIERE DES PRAIRIES, (Postal Dist. Montreal), QUE. Municipality, Riviere des Prairies, Que. C. E. Gravel Town Hall, Riviere des Prairies, Que., town engr.

Reverend Marist Brothers, Laval College, St. Vincent de Paul, Que., Day Labor, Separate Contracts $400,000, 2 story, 141x364 ft., rein.-con. arena ST. VINCENT DE PAUL, QUE. C. Grenier, 170 Geneva Cres., Mount Royal, Que., archt.

BUILDINGS
LOW BIDS AND CONTRACTS

Claydon Co. Ltd., 290 Garry St., Winnipeg, Man., CA $469,510, SUPPLY bldg., WINNIPEG, MAN. Govt. of Canada, Dpt. National Defence, Ottawa, Ont. CD 9/30.

L. E. Shaw Ltd., P. O. Box 996, Halifax, N. S., Own forces, $100,000, PLANT, FREDERICTON, N. B.

Richard & B. A. Ryan Ltd., 1705 William St., Montreal, Que., CA, $350,000, concrete, brick, granite base, brick, stone trim STORE, Richelieu and James St. ST. JOHNS, QUE. F. W. Woolworth Co. Ltd., 357 Bay St., Toronto, Ont.

▲ **Engineered Buildings (Sask) Ltd.**, 2136 Queen St., Regina, Sask., CA, Approx. $1,000,000, 320-unit low-rent prefab. HOUSING, Gladmor Park development, REGINA, SASK. Gladmor Developments Ltd., 515 Fifth Ave. W., Calgary, Alta.

AMERICANS ABROAD

HEAVY CONSTRUCTION
LOW BIDS AND CONTRACTS

▲ **Morrison-Knudsen Constr. Co.**, 319 Broadway, Boise, Idaho, LB $20,800,000, earth and rockfill dam of 131 meters high with spillway and diversion tunnels, for the Ambuklao Hydro Dam, Baguio Power Proj., PHILIPPINE ISLANDS. National Power Corp. of Manila, Natnidad Bldg., Manila, Philippine Islands. Bids Oct. 15. CD 8/29, under Public Buildings.

Proposed Projects

WATER SUPPLY

▲ **Calif., El Centro**—City, 561 State St., expansion of water treatment plant and facilities $2,000,000. James M. Montgomery, 15 N. Oakland Ave., Pasadena, consult. engr.

▲ **Colo., Brighton**—South Adams County Water Dist., Derby, water lines and water tr. plant, $1,500,000. Ripple & Howe, 426 Cooper Bldg., Denver, consult. engrs. and archts.

Fla., St. Cloud—City, WW imprvs. $350,000.

Ga., Monroe—City, voted bonds, WW imprvs. $140,000.

Mo., St. Louis—City, Frank J. McDevitt, pres. Bd. P. Service, 304 City Hall, 12 and Market Sts., Zone 3, replacement of present pumps and auxiliaries at Chain of Rocks WW pumping station on Mississippi River at north end of city, $800,000. CD 11/28/45.

▲ **O., Columbus**—City, City Hall, 12 mi. sys. of water mains, ranging from 20- to 48-in. to link new Hoover Reservoir to Columbus WW sys. $2,500,000. Burgess & Niple, 584 E. Broad St., consult. engrs. CD 6/27/51.

Tex., Austin—City, c/o Walter Seaholm, city engr., raw water pumping station, water supply lines, $125,000. Freese & Nichols, 407 Danciger Bldg., Fort Worth, consult. engrs.

▲ **Tex., Corpus Christi**—Lower Nueces River Water Supply Dist., c/o Fenner Roth, chn., Jones Bldg., and 1206 S. Staples St., voted bonds Dec. 13, Wesley Seale Dam, Nueces River, near Sinton, to impound 300,000-acre ft. water as municipal water supply for City of Corpus Christi, $15,000,000. Myers & Noyes, Wilson Bldg., consult. engrs. CD 11/24.

▲ **Tex., Dallas**—City, City Hall, Main and Harwood Sts., water pipe line, tapping Red River from near Gainesville, $550,000; pipe line, tapping White Mountain Reservoir, near Fort Worth for water supply to city of Dallas, $750,000; earth-concrete water retention dam on West Fork of Trinity River, $250,000; various water supply mains, $10,736,000; water service lines and standardize mains in Pleasant Mound, Pleasant Grove and Lake June areas, $1,178,000; new water mains, toward development on new addns., $1,700,000; water storage, concrete ground and elevated steel, $1,601,000; general WW sys. expansion and rehabilitation, $7,800,000; 48 in. water main to service Oak Cliff area, Carrollton, water plant to Westmoreland and Singleton, $1,300,000. Forrest & Cotton, Praetorian Bldg., Dallas, consult. engrs. Lockwood & Andrews, Union Natl. Bank Bldg., Houston, engrs. CD 5/8.

Tex., Dallas—City, City Hall, Main and Harwood Sts., water supply wells drilling and developing, Well No. 1, 1,750,000 gal. daily capacity, $70,000; Well No. 2, 2,250,000 gal. daily capacity, $90,000; Well No. 3, $65,000; Well No. 4, $100,000; Well No. 5, $85,000; Well No. 6, $75,000. J. G. Rollins, c/o owner, Ch. P. Wks. Engr. CD 11/21/51.

▲ **Tex., Lubbock**—City, voted bonds Dec. 12, general rehabilitation of existing WW $250,000; elevated and ground water storage, $200,000; addnl. water mains, distr. lines and main water line into city from field, $1,750,000; water supply field, $1,919,000; water field, $14,000,000. H. N. Roberts & Assoc., 1210 Avenue Q, consult. engrs.

Tex., Marlin—City, voted bonds, addnl. water supply mains and distr. lines, $294,000; rehabilitation existing WW sys. $90,000; water storage, steel, elevated, $70,000; water supply expansion, $75,000. Joe J. Rady, 811 Insurance Bldg., Fort Worth, consult. engr.

▲ **Utah, Ogden**—Weber Basin Conservancy Dist., Ogden, voted $6,500,000 bonds, 4 water purification plants and supply lines to towns within Water Conservancy Proj., Davis and Weber Counties. Templeton & Linke, Dooly Bldg., Salt Lake City, engrs.

▲ **Utah, Salt Lake City**—Salt Lake County Water Conservancy Dist., c/o E. W. Clyde, secy., 331 State St., voted bonds, county-wide water distr. sys. to supply communities within the district with culinary and domestic water. $1,990,000. David I. Gardner, Midvale, engr.

Newfoundland, St. John's—City, H. G. R. Mews, mayor, City Hall, St. John's, water supply source at Petty Harbor Long Pond for city to build dam to raise level of pond, bring water into city mains. $700,000.

SEWERS, WASTE DISPOSAL

▲ **Calif., Sunnyvale**—City, City Hall, sewage treatment plant, disposal unit, etc. $1,500,000. Brown & Caldwell, 233 Sansome St., San Francisco, consult. engrs.

Fla., St. Cloud—City, sanitary sewarage imprvs. $400,000.

O., Dover—City, sewage disposal plant, $380,000. Paul A. Uhlmann & Assoc., 1441 N. High St., Columbus, consult. engrs. CD 9/13/49.

O., Shelby—City, sewage disposal plant. $700,000. Floyd Browne & Assoc., Marion, engrs. CD 11/11.

Okla., Clinton City—voted bonds Dec. 9, sewage disposal plant. $130,000. C. E. Bretz, 1916 N. Broadway, Oklahoma City, consult. engr. CD 11/26.

Tex., Houston—W. R. Reid Development Co., 2601 Yale St., sanitary sewers, $65,000; storm sewers area ground work, for drainage, $60,000, area of Spring Oaks Subdivision, near Spring Branch.

Tex., Houston—Robindell Corp., c/o R. C. Kuldell, 5100 Fannin St., sanitary sewer lines, $70,000; drainage and storm sewers, $65,000. R. C. Shaner, 4019 River Dr., consult. engr.

Tex., Lubbock—City, voted bonds Dec. 12, sanitary sewerage sys. collection lines imprvs. and line extens. $300,000; sewage disposal plant, $225,000; storm water controls, $60,000. H. N. Roberts & Assoc., 1210 Avenue Q, consult. engrs.

Wash., College Place—City, City Hall, bond election Jan. 19, disposal plant, $325,000. F. Ofner, College Place, consult. engr.

Wyo., Sundance—City, sewerage imprvs., $150,000. Staven Eng. Co., Rapid City, S. D., consult. engr.

BRIDGES

Ind., Marion—Grant Co., bridges over Mississnewa River at Branson St. and Highland Ave. $250,000. Pierce & Gruber, Hume Mansur Bldg., Indianapolis, consult. engrs. CD 1/3/47.

MASSACHUSETTS—Commonwealth of Mass., Dpt. P. Wks., 100 Nashua St., Boston, Mass.,

Brookline—underpass Hammond St. and Worcester Turnpike, $100,000.

▲ **NORTH CAROLINA**—State Hy. & P. Wks. Comm., Raleigh,

Craven Co.—bridge over Trent River on U. S. 70, New Bern. $1,250,000. CD 8/7/51.

SOUTH CAROLINA—State Hy. Dpt., Columbia,

Charleston Co.—bridge over Wappo Creek on Hy. 700. $500,000.

TENNESSEE—State Hy. Dpt., Nashville,

Knox Co.—Gay Street Viaduct, Knoxville. $750,000.

▲ **N. B., St. John**—City, H. D. Hopkins, clk., City Hall, bridge across St. John Harbor, railway and highway bridge, $4,300,000-$6,400,000; suspension bridge $10,000,000-$12,000,000. P. L. Pratley, 1117 St. Catherine St. W., Montreal, Que., consult. engr.

STREETS AND ROADS

ALABAMA—State Hy. Dpt., Montgomery,

Mobile Co.—4-lane highway over Mobile Bay Causeway. $750,000. CD 12/18/51.

FLORIDA—State Road Dpt., Tallahassee,

Polk Co.—State Road 60 By-pass highway, Bartow, $150,000.

Ill., Chicago—City, City Hall, Adams St. imprvt. from Western Ave. to Clinton St., $125,000; Chicago Ave. imprvt. California St. to Ogden Ave. and Kedzie St. to Crawford Ave., $300,000; Wells St. imprvt. from Kinzie St. to Clark St., $200,000.

SOUTH CAROLINA—State Hy. Dpt., Columbia,

Newberry Co.—3 mi. by-pass of city of Newberry on Greenville-Newberry Hy. $150,000.

Tex., El Campo—City, cancelled Dec. 16 bond election, street paving, $675,000; concrete curbs and gutters, $75,000. Freese, Nichols & Turner, 2111 C & I Bldg., Houston, consult. engrs. CD 12/1.

Tex., LaPorte—City, voted $200,000 bonds, Dec. 9, 15 mi. improved streets, incl. flexible base and asph. surf. $400,000. CD 12/1.

Tex., Lone Star—Spartex Development Co., c/o Powell & Powell, engrs., Thomas Bldg., Dallas, street imprvs., 1½ in. blended rock asph. wearing surf., grav. fdn., concrete sidewalks, $150,000.

EARTHWORK, WATERWAYS

† **California**—U. S. Eng., Wright Bldg., Sacramento, downstream channel clearing of 20 mi. Littlejohn Creek Channel, etc. near Farmington. $500,000.

▲† **California**—U. S. Eng., 751 S. Figueroa St., Los Angeles, 4,000 lin. ft. soft-bottom channel with ungrouted stone revetments, etc. on Los Angeles River between Pacific Electric Railway Bridge and Pacific Ocean $1,000,000; 1,000 lin. ft. trapezoidal channel, etc. also replace bridge from Sta 570 to Sta 560, Los Angeles River between Steward and Gray Rd. to Pacific Electric Ry. Bridge, $500,000; imprvs. to Rio Hondo Channel from S.P.R.R. to Santa Ana Freeway, incl. bridge, etc. Approx. $1,000,000; 16,000 ft. rein.-con. invert slab, 4 bridges etc. Lopez Flood Control Basin to Arleta Ave. Pacoima Wash Channel, $1,000,000. CD 1/24/45.

▲† **Iowa**—U. S. Eng., Clock Tower Bldg., Rock Island, Ill., constr. Stage II of 38 ft. lift Lock No. 19 in Mississippi River with chamber of 1200 ft. usable length and 110 ft. width landward of existing dock and drydock on Mississippi River. $10,000,000. (Correction—cost).

▲ **Mich., Alma**—Bd. Supervs. Gratiot Co., Alma, Maple River Drainage Proj., 343,000 acres in Gratiot, Clinton and Shiawassee Counties. $1,500,000.

▲† **Missouri**—U. S. Eng., 420 Locust St., St. Louis, Zone 2, 17 ft. earthen levee along Mississippi River between Old Monroe, Lincoln Co. and Portage des Sioux in St. Charles Co. $2,326,000.

▲† **Oregon**—U. S. Eng., Pittock Block, Portland, Powerhouse, Phase 1, Approx. $10,000,000; 4 generators, Approx. $5,000,000; powerhouse intake gates, support beams and machinery, Approx. $5,000,000; 2 powerhouse fish channel water supply turbines, Approx. $100,000; 2 powerhouse bridge cranes, Approx. $100,000; intake deck crane, Approx. $100,000; relocation of S.P. & S. tracks, Washington shore, Approx. $100,000; relocation of UP tracks and Hy. No. 30, The Dalles to Celilo Approx. $1,000,000; relocation of UP tracks and Hy No. 30, Celilo to Deschutes River, Approx. $100,000, The Dalles Dam, Columbia River.

▲ † **Oregon**—U. S. Eng., Pittock Block, Portland, Dexter Dam and powerhouse, Approx. $5,000,000; relocate State Hy. 58, Approx. $100,000, Lookout Point Reservoir Proj., Middle Fork, Willamette River, Lane Co. CD 4/21/44.

† **Oregon**—U. S. Eng., Pittock Block, Portland, bank protection and channel imprv., Cox Location, Lane Co. Approx. $100,000.

† **Oregon**—U. S. Eng., Pittock Block, Portland, install mechanical and electrical equip., Big Cliff powerhouse, Approx. $100,000; relocate Kinney Creek Rd., Approx. $100,000, Detroit Reservoir Proj., North Santiam River, Marion Co.

† **Tex., Texarkana**—U. S. Eng., Box 61, Tulsa 2, Okla., excavating, trenching, backfilling for water, gas and sewer service lines, sidewalks and curbs, pavement of flexible aggregate base course, Inv. No. Eng. 34-066-53-66. $100,000. Chappell & Landauer, Brenneks, Guerrero & Shafer, and Howard R. Meyer, Burt Bldg., Dallas, engrs.-archts.

▲ **Ontario**—Hydro-Electric Power Comm., University Ave., Toronto, 43 mi. power line from Glanford to Petersburg transformer station near Kitchener, Power from New Niagara Project 230,000 volts. Approx. $2,492,000. CD 9/5/50.

AIRPORTS

▲† **Ark., Jacksonville**—AIR BASE—U. S. Eng., 300 Broadway, Little Rock, air base, incl. paving, liquid fuel storage, lighting, operational bldgs., maintenance bldg., troop housing, medical bldg., storage and utilities, $23,700,000. E. M. Freeman & Assocs., Commercial American Bank Bldg., Shreveport, La., and Landauer, Gurero & Shafer, Burt Bldg., Dallas, Tex., consult. engrs. Erhart, Eichenbaum & Rauch, Wallace Bldg., Little Rock, Ginocchio & Cromwell, Hall Bldg., Little Rock, and Wittenberg, Delony & Davidson, Pyramid Life Bldg., Little Rock, consult. archts. (Correction—location of project). CD 12/11, under Ark., Jackson.

▲ **Mo., Kansas City**—TRAFFIC BRIDGE—City, c/o L. P. Cookingham, City Hall, 4-lane traffic bridge over Missouri River at Municipal Airport west of Hannibal structure 2,135 ft. long, 60 ft. wide, 55 ft. above stand, high water mark, $5,500,000. Howard, Needles, Tammen & Bergendoff, 921 Walnut St., Kansas City, Mo., engrs. CD 8/12/52.

▲ † **Tex., Abilene**—AIR BASE—U. S. Eng., 100 W. Vickery St., Fort Worth, runway constr. $975,000; taxiways, $650,000; parking aprons, $475,000. Lockwood & Andrews, Union Natl. Bank Bldg., Houston, consult. engrs. CD 12/10.

Wash., Yakima—AIRPORT—City, City Hall, bond election Mar. 10, airport extension, $200,000. A. B. Collins, city engr. CD 8/18.

PUBLIC BUILDINGS

Ark., Tucker—PRISON FARM—Arkansas State Penitentiary, Tucker, state prison farm buildings. $800,000. CD 9/7/50.

Calif., Los Angeles—COURTS—Los Angeles Co., Hall of Records, plans by Allen & Lutzi, 6112 Wilshire Blvd., East Los Angeles Court Bldg. and sheriff station, East Los Angeles, $536,343.

Calif., San Carlos—SCHOOL—San Carlos Elementary School Dist., 826 Chestnut St., voted $500,000 bonds, White Oaks School addn., John Carl Warnecke, 507 Howard St., San Francisco, archt., Britain Acres School and Tierra Linda School addns., John Lyon Reid, 1069 Market St., San Francisco, archt. CD 10/7.

Calif., San Francisco—SCHOOL—Dpt. P. Wks., City Hall, plans by Kent & Hass, 525 Market St., Ridgepoint School. $800,000. CD 11/17/48.

▲ **Calif., San Jose**—HOSPITAL—Santa Clara Co., Court House, addn. to Santa Clara County Hospital. $1,000,000.

Colo., Fountain—SCHOOL—School Dist. No. 8, Pueblo Co., Fountain, voted $297,000 bonds, Senior High School, 22,700 sq. ft. floor space. $457,000. Earle A. Deits, 413 Mining Exch. Bldg., Colorado Springs, consult. engr. and archt. CD 11/19.

Ga., Atlanta—ARCHIVES—State, c/o Secretary of State Fortson, State Capitol, archives bldg. addn. $500,000. CD 1/12/44.

▲ **Ga., East Point**—HOSPITAL—City, City Hall, hospital, $1,000,000.

▲† **Ill., Great Lakes**—WAREHOUSES—Ninth Naval Dist., Great Lakes Naval Training Station, Great Lakes, plans by Graham Anderson Probst & White, 80 E. Jackson Blvd., Chicago, Zone 4, 2 storage warehouses. $2,500,000.

▲ **Ill., Kaneville**—SCHOOLS—School District 302, Kaneville, plans by Rudolph & Young, 111 W. Monroe St., Chicago, Zone 3, high school and grade school, near Sugar Grove. $1,500,000.

Ind., Columbus—SCHOOL—School City of Columbus, school addn., $750,000.

Ind., Muncie—SCHOOL—School City of Muncie, Muncie, plans by McGuire & Shook, Fletcher Trust Bldg., Indianapolis, Longfellow School, Centennial Ave. and Elgin St. $525,000. CD 10/16.

Mass., Chicopee—SCHOOL—City, School Dpt., J. F. Fitzpatrick, 135 Grape St., plans by Henry J. Tessier, 230 Dwight St., Springfield, elementary school, Aldenville Sect. $600,000. CD 12/10.

▲ **Mass., Wakefield**—SCHOOL—Town, High School Bldg. Comn., Town Hall, plans by Adden Parker Clinch & Crimp, 177 State St., Boston, 2 story, brick, steel, concrete high school. $2,000,000. CD 9/20/49.

▲ **Mass., Worcester**—HOSPITAL and NURSES HOME—State, Dpt. Mental Health, 15 Ashburton St., Boston, plans by M. A. Dyer, 24 School St., Boston, and Porter W. Dorr, landscape archt., 101 Eliot Ave., Newton, 3 story, bsmnt., 39x178 ft., brick, steel, concrete state hospital, 5, 6, 9 story 535 ft. long wings, 46 ft. wide nurses home. $8,000,000. G. Nelson Perry & Co., Inc., 36 Bromfield St., Boston, struct. engr. CD 1/15/52.

▲ **Mich., Detroit**—POWER PLANT—City, Public Lighting Comn., 174 E. Atwater St., brick, steel, concrete Mistersky Power station addn., 5425 West Jefferson St., $7,500,000, Louis J. Schrank, city engr. CD 8/23/44.

▲ **Mich., Flint**—HOSPITAL—Hurley Hospital, Flint, plans by Fugard Burt, Wilkinson & Orth, 520 N. Michigan St., Chicago, Ill., one 11 story wing, one 3 story wing Hurley Hospital addn. $3,000,000. CD 11/15/50.

Minn., Monticello—SCHOOL—Bd. Educ., W. A. Sandberg, clk., voted $430,000 bonds, 1 story high school, Haarstick, Lundgren & Assoc., W. 1385 West First National Bank Bldg., St. Paul, archts.

▲ **N. C., Kinston**—POWER PLANT—City, power plant addn. $1,750,000. Wm. C. Olsen, 5 Exchange Pl., Raleigh, consult. engr. CD 11/14.

O., Akron—RECEIVING HOSPITAL—Dpt. P. Welfare, State Office Bldg., S. Front St., Columbus, Summit Receiving Hospital. $471,100. CD 7/13/45.

▲ **O., Apple Creek**—HOSPITAL—Dpt. P. Welfare, State Office Bldg., S. Front St., Columbus, hospital bldg. and equip. for 1,500 patients, $3,200,000; admin. bldg. $800,000, Apple Creek State Hospital.

▲ **O., Athens**—HOSPITAL—Dpt. P. Welfare, State Office Bldg., S. Front St., Columbus, bldgs. for aged patients, $750,000; wards for male patients, $630,000; power plant addns., repairs and addns. at rest of institution, $560,000, Athens State Hospital.

O., Cambridge—RECEIVING HOSPITAL—Dpt. P. Welfare, State Office Bldg., S. Front St., Columbus, receiving hospital at Cambridge State Hospital, $750,000.

▲ **O., Cincinnati**—BLDG. for AGED, etc.—Dpt. P. Welfare, State Office Bldg., S. Front St., Columbus, bldg. for aged, $1,000,000; fireproofing existing bldgs., $500,000, Longview State Hospital. CD 9/2/49.

▲ **O., Cleveland**—HOSPITAL—Dpt. P .Welfare, State Office Bldg., S. Front St., west wing addn., $560,000; hospital and equip. for 1,000 patients, $5,400,000; therapy bldg., $550,000, at Cleveland State Hospital.

▲ **O., Cleveland**—HOSPITAL UNIT—Dpt. P. Welfare, State Office Bldg., S. Front St., Columbus, disturbed patients unit at Hawthornden State Hospital, $1,500,000.

▲ **O., Columbus**—HOSPITAL—Dpt. P. Welfare, State Office Bldg., S. Front St., Columbus, Columbus State Hospital and bldg. for violent patients, $3,443,635.

O., Columbus—PENITENTIARY IMPRVS.—Dpt. P. Welfare, State Office Bldg., S. Front St., Ohio Penitentiary imprvs., incl. 2 wings to industrial bldg., $320,000; misc. bldg. imprvs. and repairs, $468,900, at Roseville, brick plant.

▲ **O., Columbus**—SCHOOL—Dpt. P. Welfare, State Office Bldg., S. Front St., recreation therapy and school, $1,750,000; surgical and medical bldg., $600,000; receiving bldg., $800,000, Columbus State School for Feeble-Minded, W. Broad St.

▲ **O., Dayton**—HOSPITAL—Dpt. P. Welfare, State Office Bldg., S. Front St., Columbus, nurses home, $500,000; hospital addn., $650,000, Dayton State Hospital. CD 10/23/45.

▲ **O., Gallipolis**—HOSPITAL—Dpt. P. Welfare, State Office Bldg., S. Front St., Columbus, Gallipolis State School, hospital, $750,000; bldg. to house 100 patients and other imprvs., $500,000.

▲ **O., Lancaster**—SCHOOL BLDGS.—Dpt. P. Welfare, State Office Bldg., S. Front St., Columbus, school bldgs. at Boys Industrial School. $1,250,000.

O., London—DORMITORY—Dpt. P. Welfare, State Office Bldg., S. Front St., Columbus, honor dormitory for London Prison Farm. $750,000.

▲ **O., Marion**—TRAINING SCHOOL—Dpt. P. Welfare, State Office Bldg., S. Front St., Columbus, Marion Training School imprvs., bldgs. to house prisoners, $5,000,000; power plant addn., $600,000.

▲ **O., Massillon**—HOSPITAL—Dpt. P. Welfare, State Office Bldg., S. Front St., Columbus, state receiving hospital. $1,140,000.

O., Mt. Vernon—BUILDING—Dpt. P. Welfare, State Office Bldg., S. Front St., Columbus, bldg. at Mt. Vernon State Hospital. $749,250.

▲ **O., Orient**—HOSPITAL, etc.—Dpt. P. Welfare, State Office Bldg., S. Front St., Columbus, hospital, $600,000; admin. bldg., $400,000; 2 cottages, $500,000; sewage treatment works and other imprvs., $250,000, Orient State Institute.

▲ **O., Tiffin**—HOSPITAL—Dpt. P. Welfare, State Office Bldg., S. Front St., Columbus, receiving hospital, $1,750,000; 2 maximum security bldgs., $600,000, Tiffin State Hospital.

▲ **O., Toledo**—HOSPITAL—Dpt. P. Welfare, State Office Bldg., S. Front St., Columbus, receiving hospital addn., Toledo State Hospital. $1,020,000.

▲ **R. I., Newport**—SCHOOLS—City, Carl H. Porter, supt. Schools, City Hall, 2 elementary schools. $1,000,000.

R. I., Warren—HIGH SCHOOL—Town, G. P. Flynn, chn. School Comn., Town Hall, high school. $500,000. CD 5/24/45.

† **S. C., Charleston**—FACILITIES—P. Wks. Office, Dpt. Navy Charleston, processing and test facilities at Naval Ammunition Depot, NOY 76214. $500,000. Patchen & Zimmerman, 525 Telfair St., Augusta, Ga., consult. engrs.

S. C., Laurens—HIGH SCHOOL—School Dist. 5, Laurens, White High School. $478,000.

▲ **Tex., Galveston**—CLASSROOM, etc.—University of Texas (Galveston Medical Branch), c/o Bd. of Regents, Austin, classroom addns. to Gail Borden Bldg., $1,250,000; animal laboratory, $1,250,000; 1,000 seating auditorium, $1,000,000; medical science classrooms bldg., $775,000; gymnasium, $750,000.

Tex., Inks Lake (near Burnet)—MOTEL and COTTAGES—Texas State Park Bd., Frank D. Quinn, chn. State Bldg., Austin, plans by Page, Southerland & Page, 602 West Ave., Austin, 100-room motel and cottages. $550,000. CD 4/16.

▲ **Va., Richmond**—HOSPITAL—State Dpt. Health, State Office Bldg., and Medical College of Virginia, 1200 E. Broad St., plans by Merrill C. Lee, 601 E. Franklin St., 450-bed hospital and surgical diagnostic unit. $5,000,000. CD 9/25/51.

▲ **Alta., Calgary**—HOSPITAL WING—Dpt. Veterans Affairs, Daly Bld., Ottawa, Ont., plans by Rule, Wynn & Rule, 513 8 Ave. W., 6 story, Col. Belcher Military Hospital wing, $2,800,000.

▲ **Ont., Hamilton**—HOME—City, L. D. Jackson, mayor, City Hall, plans by Stan Roscoe, c/o owner, ch. archt., 1 story with three wings, home for aged, 3 story administrative section, auditorium, Sherman Ave. $1,500,000. CD 12/23/49.

COMMERCIAL BUILDINGS

Calif., Stockton—HOSPITAL WING—St. Joseph's Hospital, N. California St., plans by Leonard F. Stark, Native Sons Bldg., Sacramento, St. Joseph's Hospital wing. $600,000. CD 5/17/46.

▲ **Calif., Van Nuys**—DWELLINGS—Diller-Kalsman, 8549 Wilshire Blvd., Los Angeles, plans by Martin Stern, Jr., 450 N. Beverly Dr., Beverly Hills, 877 frame, stucco dwellings, 560 on Branford St. between Laurel Canyon and Woodman Aves.; 317 on Van Nuys Blvd. and Woodman Ave. $5,000,000.

Conn., West Hartford—CLUB HOUSE, etc.—The Hartford Golf Club, Golf Rd., plans by Keith Sellers Heine, 71 Oxford St., Hartford, club house, tennis courts, swimming pool, parking facilities, north of Albany Ave. $700,000.

▲ **Ga., Atlanta**—SHOPPING CENTER—Ward Wight & Co., Healey Bldg., shopping center, $1,500,000.

▲ **Ky., Highland Heights**—SHOPPING CENTER—Fourth Realty Co., c/o Al. Gordon, Schmidt Bldg., Cincinnati, O., plans by Ed. Beiting, 1002 Monmouth St., Newport, Holly Woods Shopping Center on Alexandria Pike, Highland Heights, $2,000,000; fifty 1-family detached homes, Holly Woods Dr. and Hawthorne Ave., Highland Heights, in Campbell County, $1,500,000, Morlidge & Morlidge, 104 W. Fourth St., Cincinnati, O., consult. engrs.

▲ **Ky., Louisville**—LIBRARY—Southern Baptist Theological Seminary, 2825 Lexington St., plans by Jas. H. Kolbrook, Starks Bldg., library. $1,000,000. E. R. Ronald, 554 S. Third St., consult. engr.

Me., Kittery—RESIDENTIAL DEVELOPMENT—Kittery Homes, Inc., c/o Lester N. Lechter, designer, 8 Maria Ave., Sharon, Mass., 110 residential development units, $880,000.

Mass., Arlington—TELEPHONE EXCHANGE—New England Telephone & Telegraph Co., 185 Franklin St., Boston, plans by Cram & Ferguson, 248 Boylston St., Boston, 3 story, bsmnt., 80x100 ft., masonry telephone bldg. $500,000.

▲ **Mo., Kansas City**—RESIDENCE HALL, etc.—Rockhurst College, c/o Very Rev. Maurice E. Van Ackeren, pres., plans by Shaughnessy & Bower, 3527 Broadway, Kansas City, Mo., faculty residence, conversion of Sedgwick and Dowling Halls, $675,000; admin. and student union bldg., $600,000, library, residence hall, classroom bldg. Total est. $1,275,000. CD 12/1/44.

▲ **N. Y., Bayshore**—HOSPITAL—Southside Hospital, Montauk Hy., plans by Eggers & Higgins, 100 E. 42 St., New York, Zone 17, 4 story maternity wing and 2 story addn. to X-Ray wing at hospital. $1,000,000.

N. C., Durham—HOTEL—Washington Duke Hotel, Durham, remodel hotel, $500,000.

▲ **O., Columbus**—HOUSING—Community Builders, Inc., 374 N. Virginia Lee W., 18 bldgs. housing development, $1,750,000.

▲ **O., Columbus**—TELEPHONE EXCHANGE—Ohio Bell Telephone Co., 750 Huron St., Cleveland, 3 or 5 story, brick, steel, concrete telephone exchange. $6,000,000.

O., Toledo—SYNAGOGUE—Congregation B'Nai Israel, 2247 Collingwood St., plans by Herman Feldstein, Spitzer Bldg., synagogue and Hebrew School and library on 6-acre site at Kenwood Blvd. and Toledo Terminal R. R. $800,000. CD 4/21/49.

▲ **O., University Heights**—DORMITORY, etc.—John Carroll University, University Heights, plans by Small, Smith & Reeb, 1010 Euclid Ave., Cleveland, dormitory, physics bldg., school of business bldg., student union bldg., gymnasium-swimming pool; stadium, power plant addn. $5,000,000. CD 9/23/49.

▲ **O., Willoughby**—HOUSING and SHOPPING CENTER—Mavec Constr. Co., 289 E. 200 St., Cleveland, housing and shopping center, near Rte. 20. $20,000,000.

Okla., Oklahoma City—BUSINESS DISTRICT—Park Estates Corp., Liberty Bank Bldg., plans by Robert D. Stone, 1225 Linwood St., 12 stores, business district N. E. 36 and Kelley Sts. $600,000.

Pa., Erie—SCHOOL—Catholic Diocese of Erie, 10 and Sassafras St., plans by Stickle & Assocs., 2422 Prospect St., Cleveland, O., 3 story, 165x180 ft. Cathedral Prep School addn. $600,000.

▲ **Pa., Pittsburgh**—SCHOOL, etc.—St. Sebastian R. C. Congregation, McKnight and Selbert Rds., plans by Nathan Canton, 121 S. Negley St., parochial school, church and convent, McKnight Rd., Ross Twp. $1,200,000.

Tex., Brownsville—EDUCATIONAL, etc.—Seventh-Day Adventist Church Congregation, Brownsville, plans by R. Gordon Pierce, 925 Chicago St., educational bldg., auditorium, 28 Coria St. $450,000.

Tex., Corpus Christi—NURSES HOME—Spohn Hospital, c/o Mother Mary Vincent, administrator, 1436 Third St., plans by Wade, Gibson & Martin, 419 Prof. Bldg., masonry type nurses home. $600,000.

Tex., Galveston—HOTEL—Jack Tar Court Hotel, North Beach, plans by Thos. M. Price, 819 Broadway, 60-room hotel expansion. $850,000. R. L. Reid, 2506 Richton St., Houston, consult. engr. Rivoire & Pool, 2506 Richton St., Houston, engrs. CD 11/7.

▲ **Tex., Houston**—DWELLINGS—Boyer & Sowda, 3405 N. MacGregor St., Unit 1, six 1 and 2 story masonry dwellings, $300,000; Unit 2, 10 dwellings, $325,000; Unit 3, 15 dwellings, $400,000; Unit 4, 8 dwellings, $320,000; Unit 5, 12 dwellings, $415,000; Unit 6, 18 dwellings, $450,000, in new area Greekside Manor.

Tex., Houston—DWELLINGS—Meadowbrook Building Co., c/o A. V. Arnold, 4377 Winkler St., 40 frame dwellings, $310,000; 60 frame dwellings, $425,000, off Yale and Victoria Sts.

Tex., Lamesa—CHURCH—First Baptist Church Congregation, Lamesa, plans by Allen & Allen, Lamesa, 42,000 sq. ft. brick, hollow tile educational church, concrete pier and beam fdn. $500,000.

Tex., Midland—HALL, EDUCATIONAL, etc.—St. Marks Methodist Church, Jas. B. Sharp, 1709 N. Main St., plans by Atcheson & Atkinson, Lubbock, hall, educational, sanctuary. $450,000. CD 2/14/52.

Tex., San Antonio—COMMERCIAL—Distributors Realty Co., 506 Dolorosa Ave., concrete, metal, steel commercial bldg. $525,000.

▲ **Va., Portsmouth**—HOUSES—George T. McLean Co. Inc., High St. at Belt Line Ry., 270 houses, incl. approx. 40,000 sq. yd. concrete street paving $2,000,000. Carroll Bounds & W. C. Crocker, c/o owner, engrs.

Va., Richmond—CHURCH—Barton Heights Baptist Church, 2700 Hanes Ave., plans by Merrill C. Lee & Son, 601 E. Franklin St., church. $900,000.

Que., Three Rivers—HOUSING UNITS—J. M. Laflamme, Three Rivers, plans by E. Bujold, 6904 Molson Ave., Montreal housing units, north end of city, $950,000.

INDUSTRIAL BUILDINGS

▲ Ala., Calera—PLANT—Westinghouse Electric Corp., Union Bank Bldg., Pittsburgh, Pa., mfg. plant. $3,000,000.

▲ Calif., Anaheim—PLANT—Delco-Remy Div., General Motors Corp., 2401 Columbus Ave., Anderson, Ind., storage battery plant, Magnolia Ave. between LaPalma and Southern Pacific R.R. $2,000,000.

▲ Ga., Savannah—PLANT—American Cyanamid Co., 30 Rockefeller Plaza, New York, 20, N. Y., plans by Robert & Co. Assoc., 96 Poplar St. N.W., Atlanta, plant. Approx. $2,000,000. CD 1/26/51.

▲ Ill., Franklin Park—FACTORY—Motorola, Inc., 4545 Augusta Blvd., Chicago, plans by John C. Cromelin, 6455 S. Central St., Chicago, Zone 38, 270,000 sq. ft. factory. $2,500,000.

▲ Ill., Plainfield—PLANT—Hazel-Atlas Glass Co., 15 and Jacob Sts. ,Wheeling, W. Va., plans by A. Epstein & Sons Co., 2011 Pershing Rd., Chicago, Zone 9, glass plant, incl. 12 buildings. $4,000,000. CD 5/13.

▲ Ky., Ashland—MILL—Armco Steel Corp., 1939 Armco Ave., Middletown, O., cold reduction mill, continuous cold strip pickler and light and heavy gage grip lines, $12,000,000.

▲ N. J., Elizabeth—PLANT—General Chemical Div. of Allied Chemicals & Dye Corp., 40 Rector St., New York, 3, N. Y., sulfuric acid plant, 120-acre site. $8,500,000.

▲ O., Willoughby—FACTORY—Thompson Products, Inc., 23555 Euclid Ave., Cleveland, 180,000 sq. ft. factory on 60-acre tract off Rte. 20 near Beidler Rd., for Tapco Div. $1,260,000.

▲ Tenn., Lowland—PLANT—American Enka Corp., Lowland, plant addn. $4,000,000.

▲ Tex., Corpus Christi—PLANT—Corpus Christi Oxygen Co., 2827 Agnes St., plant addn. $1,070,000.

▲ Tex., Dallas—PARKING—Alkro Automatic Automobile Parking System, c/o MacKie & Kamrath, archts., 2713 Ferndale St., Houston, 10 story automatic auto parking bldg. $1,000,000.

▲ Tex., Evadale—MILL—East Texas Pulp & Paper Co., (Houston Oil Co. and Time, Inc.,) Petroleum Bldg., Houston, pulp and paper mill, $6,000,000; products storage warehouse, $750,000, near here.

▲ Tex., Freeport—PLANT—Freeport Sulphur Co., Freeport, sulphur plant expansion and imprvs. $3,540,000.

Tex., Houston—PARKING and STORAGE—South Texas National Bank, 213 Main St., plans by Kenneth Franzheim, 2402 Crawford St., 9 story, structural steel, rein.-con. mechanical auto parking and storage bldg. $750,000.

▲ Tex., Port Arthur—PLANT—Gulf Oil Corp., Port Arthur, high octane aviation gasoline mfg. plant unit. $12,000,000. CD 3/22/51.

Va., Lynchourg—PLANT—Old Dominion Box Co., Lynchburg, mfg. plant in Madison Heights. $500,000.

▲ Wash., Vancouver—PLANT—Aluminum Co. of America, Gulf Bldg., Pittsburgh, Pa., cable plant. $1,720,000. CD 10/9/51.

UNCLASSIFIED

La., New Orleans—TELEVISION STATION—C.K.G. Television Co., c/o Lester Kamin, 2229 Bellfontaine St., Houston, Tex., television station. $250,000.

S. C., Woodruff—NATURAL GAS SYSTEM—Town, natural gas sys. $400,000. Porter, Barry & Assoc., 1730 Main St., Baton Rouge, La., consult. engrs. CD 2/14/52.

Tex., Lubbock—ELECTRIC SYSTEM—City, voted bonds Dec. 12, expansion of municipal electric distr. sys. $600,000; installing street lighting at 525 Residence St. intersections and 14 traffic signals; $100,000. H. N. Roberts & Assoc., 1210 Avenue Q, consult. engrs.

Wash., Grays River—HATCHERY—State Dpt. Fisheries, Smith Tower, Seattle, Zone 4, Grays River hatchery. $525,000.

Wash., Washougal—HATCHERY—State Dpt. Fisheries, Smith Tower, Seattle, Zone 4, Washougal hatchery. $500,000.

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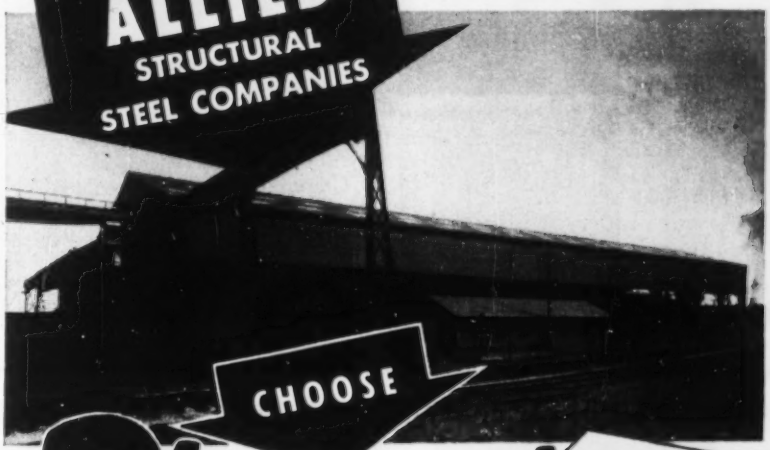

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UNIT PRICES

Earth-fill dam, South Dakota

To increase the water supply at the Rapid City Air Force Base and within Rapid City, South Dakota, the Bureau of Reclamation has awarded a $4,246,380 contract for Pactola dam to the Adler Construction Co., Loveland, Colorado, lowest of 12 bidders. The contract provides for construction of an earth-fill dam, 225 ft. high and 1,250 ft. long, with 2,100 ft. of dikes.

The work is timed for fast completion, 950 days, to provide storage for 99,000 acre-feet of Rapid Creek water. The air force base anticipated peak demand during the coming year is more than double the available supply.

Bidders include:

1C	Adler Constr. Co., Loveland, Colorado	$3,761,115
2	Guy F. Atkinson Co., South San Francisco, California	4,878,477
12	Morrison-Knudsen Co., Inc., Seattle, Wash.	6,959,509

Bids: 9-30-52 Items	Unit	Quantity	Unit Prices 1C	2
Dvrsn & care of strm drng constr & unwtrng fndn	ls	1	$45,000	$16,000
Exc, ovr-brdn, in open-cut	cy	420,000	0.35	1.22
Exc, all cl, in open-cut	cy	320,000	1.20	1.22
Exc, all cl, for cut-off wall ftngs, grout caps, cut-off	cy	1,450	22.00	20.00
Exc, all cl, in tunnel & gate chamber	cy	1,985	23.00	40.00
Exc, all cll in access shaft	cy	405	35.00	60.00
F & P perm str stl ribs, stl tunnel-liner plates & stl legging	lb	32,000	0.22	0.20
F & I tunnel-roof spt bits	lf	200	3.00	5.00
Exc, stripping borrow pits	cy	220,000	0.19	0.22
Exc, comm, in upstrm borrow area & trans to embnkmnts first 1,000,000 cy	cy	1,000,000	0.27	0.42
Exc, comm, in upstrm borrow area & trans to embnkmnts over 1,000,000 cy	cy	1,000,000	0.25	0.275
Exc, comm, in upstrm borrow area & trans to embnkmnt	cy	700,000	0.25	0.27
Exc, all cl, in rock source A & trans to embnkmnts first 183,000 cy	cy	183,000	1.25	1.22
Exc, all cl, in rock source A & trans to embnkmnts over 183,000 cy	cy	183,000	1.10	1.22
Exc, all cl, in rock source B & trans to embnkmnts first 430,000 cy	cy	430,000	0.95	1.22
Exc, all cl, in rock source B & trans to embnkmnts over 430,000 cy	cy	430,000	0.90	1.22
Backfill	cy	850	1.00	3.60
Rock fines blanket	cy	3,050	0.50	1.25
Dumped riprap	cy	6,100	1.00	1.90
Earth-fill, in embnkmnts, zone 1	cy	100,000	0.12	0.18
Sp compaction of earth-fill	cy	10,000	3.50	2.50
Rk fines fill in embnkmnts zn 2, 1st 330,000 cy	cy	330,000	0.12	0.16
Rk fines fill in embnkmnts zn 2, over 330,000 cy	cy	330,000	0.12	0.14
Rk fill in embnkmnts, zn 3 first 725,000 cy	cy	725,000	0.13	0.16
Rk fill in embnkmnts, zn 3 over 725,000 cy	cy	725,000	0.12	0.14
Drilling drainage holes	lf	300	6.00	7.00
Furn 4" dia sewer pipe & constr drains with uncemented joints	lf	420	2.00	3.00
Furn 8" dia sewer pipe & constr drains with uncemented joints	lf	20	3.00	4.00
F & laying 6" dia sewer pipe with cemented joints	lf	50	3.00	4.50
F & lay 24" dia corr met pipe	lf	350	6.00	6.50
Drl grout holes in stage btw 0' & 30' deep	lf	20,000	1.90	1.75
30' & 60' deep	lf	13,000	2.00	2.00
60' & 110' deep	lf	10,000	2.10	2.40
110' & 150' deep	lf	4,000	2.30	3.00
150' & 250' deep	lf	500	3.00	3.50
F & P pipe & ftngs for grouting	lb	13,000	0.50	0.90
Hook-up to grout holes	ea	720	7.00	10.00
Pressure grouting	sk	34,000	1.50	2.00
Press grtng with packer	sk	17,000	1.75	2.35
Dring holes for anchor bars & grtng bars in place	lf	3,900	1.00	2.00
Furn & handling cmt	bbl	21,000	4.50	4.25
F & P reinf bars	lb	320,000	0.13	0.15
Conc in cut-off wall ftng & grout caps	cy	1,234	24.00	30.00
Conc in outlet-works intake struct & conduit	cy	180	70.00	55.00
Conc in outlet-works tunnel lining & portals	cy	640	60.00	63.00
Conc in outlet-works gate chamber	cy	230	80.00	75.00
Conc in outlet-works access shaft	cy	177	70.00	66.00
Conc in outlet-works shaft house	cy	16	100.00	150.00
Conc in outlet-works stilling basin floor	cy	253	35.00	33.00
Conc in dam embnkmnt cut-off wall & outlet-works stilling basin walls	cy	784	55.00	66.00
Conc in spillway crest structure	cy	1,235	26.00	34.00
Conc in highway pvmnt	cy	591	24.00	30.00
F & P ¾" sponge-rubber joint filler	sf	40	3.00	3.00
Place rubber water stops	lf	22	2.00	2.50
F & P met water stops	lf	235	3.00	3.00
Install high-pressure gates & conduit linings	lb	63,000	0.10	0.16
Install control equip & piping for high-pressure gates	lb	5,300	0.30	0.40
Install reservoir level gage	lb	3,500	0.50	0.40
Install trashrack metwrk	lb	27,500	0.10	0.15
Install misc metwrk for gate chamber, access shaft, & shaft house	lb	5,700	0.30	0.40
F & I bypass vent & floor drain	ls	1	3,500	3,000
F & I ventil sys & air-inlet piping	ls	1	2,800	12,500
F & I metal door	sf	21	10.00	10.00
F & I metal sash window	sf	10	6.00	8.00
F & P roofing	sf	196	1.00	1.50
F & I elec met conduit, 1" or less in dia	lf	400	2.00	2.00
F & I elec met conduit, 1" & 1½" in dia	lf	20	3.00	4.00
F & I elec conductors & grounding materials	lb	100	3.00	2.50
Install elec apparatus	lb	120	2.00	2.50
F & I metwrk for incoming line dead-end structure	lb	40	3.00	3.00

Runway extensions, Kansas

Only two bidders competed for a $106,737 contract for runway extensions at Manhattan Municipal Airport, Manhattan, Kansas. Awarded to Stannard Construction Co., Wichita, Kansas by the Civil Aeronautics Administration, the contract consists of widening the existing north-west runway to 100 ft., extending it 850 to 3,800 ft., and extending the apron, taxiway, and taxiway lighting. A 7-in., non-reinforced concrete pavement with an 8-in. subbase is to be used.

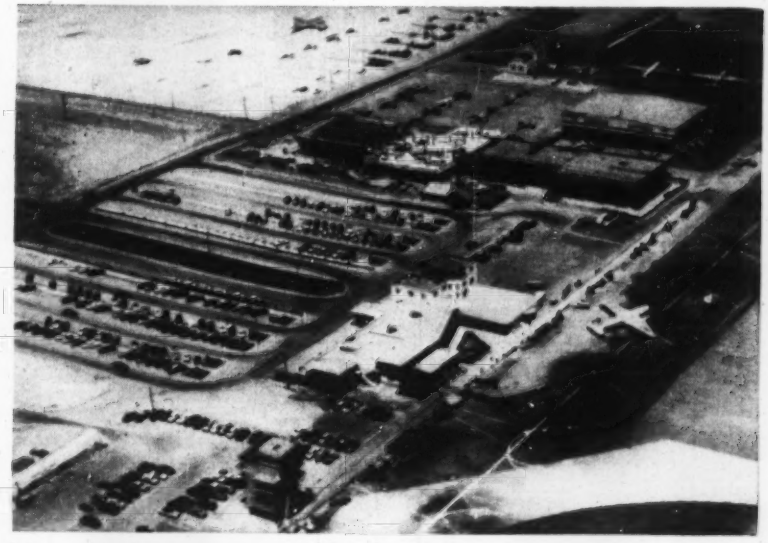
Wilson & Co., Salina, Kansas, are the engineers.

Hourly wage rates are: electricians, $2.50; carpenters, $2.00; scrapers, $1.85, and common laborers, $1.25.

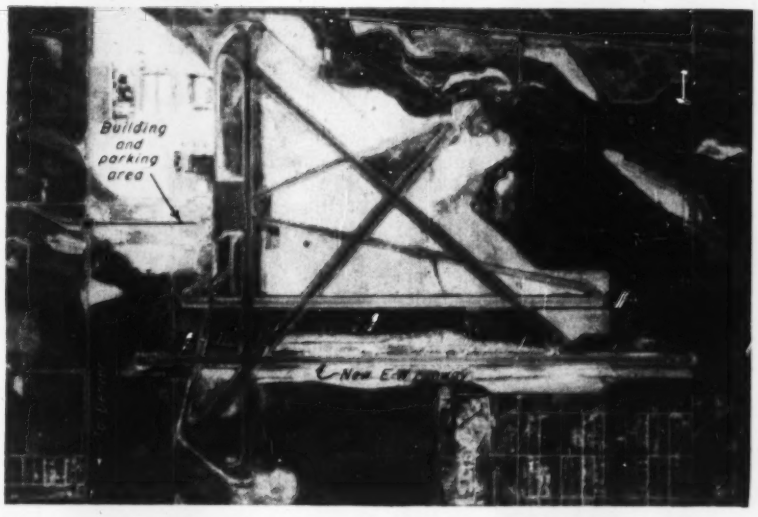
Bidders include:

1	M. W. Watson, Topeka, Kansas	$109,535
2C	Stannard Const. Co., Wichita, Kansas	109,607

Bids: 10-21-52 Items	Unit	Quantity	Unit Prices 1	2C
Uncl excavation	cy	26,000	$0.55	$0.28
Subbase for pavement	cy	4,780	2.00	1.95
Nonreinf conc pvmnt, 7"	sy	20,500	3.50	3.86
Conc for drain struct	cy	160	55.00	56.00
Inlet grate frame	ea	1	100.00	75.00
Underground duct-2 way	lf	415	1.65	2.47
Trenching & backfilling 18" minimum	lf	2,290	0.30	0.22
Underground cable, type RR 1c, # 8 -600 volt	lf	2,440	0.25	0.21
Cable markers	ea	3	25.00	9.50
Rnwy marker light, white	ea	10	76.00	64.10
Rnwy marker light, blue	ea	3	76.00	64.10
Reloc marker light	ea	41	30.00	29.95
Fencing, chain link	lf	140	5.00	4.00
Fencing, barbed wire	lf	100	0.50	1.50



New buildings at Stapleton Field . . .



plus modernized runways are product of . . .

Unique use of revenue bonds at Denver's growing airport

DENVER is well on the way to having the most modern airport in the country for a city of its size—and one that will vie in over-all adequacy and excellence with the best in any class. In addition to this distinction—and greatly contributing to it—is the fact that revenue bonds, secured solely by the facilities built with their proceeds, are defraying a major share of the cost not carried by federal aid.

This unique use of revenue bonds, in so far as airport-facility financing is concerned, has enabled the city and county of Denver to avoid adding such airport costs to the tax burden. It may well have made otherwise-impossible improvements possible. And it provides the facilities at a reasonable financing cost, judging by the fact that the $1.75 million of bonds so far issued were sold at an average interest rate of 3.3%.

The proceeds of revenue bonds have been used to finance a few other airports over the country, but not in the all-out way used at Denver. Thus, in most cases, the bonds issued to provide a certain facility have had a call on other airport facilities or even on the entire revenue of the airport. New York City's airports are being financed by Port of New York Authority revenue bonds, but these are backed by the earnings of all the authority's facilities, not only at the airports, but including bridges, tunnels and freight stations. In Denver, each facility—the restaurant, the terminal building, the ticketing building, the control tower, the hangars and an office building—must amortize its cost through its own earnings. The only exception to this financing method are the runways, which were built with a federal grant and local tax money.

Details of the financing to date are given in the accompanying tabulation.

• **An old airport improved**—Stapleton Field, as Denver's airport is called, dates from 1929 when a mayor of that name chose a site then 6 miles from town. Development, however, was slow, and it was not until the war (when it was selected as an Air Force modification center and two large hangars were built and the runways improved) that it achieved a semblance of importance.

With the end of the war, and the great predictions for growth of commercial aviation, city and county officials met with federal authorities and mapped out a development program. The cost was to be about $5 million, of which the federal government would pay 53.4%. To as large an extent as possible the local share was to be financed by revenue bonds secured by the earnings of the facilities to be built. And the development was to be spread over a period of years—building permanent facilities only as the growth of aviation business warranted, and keeping temporary facilities to a minimum.

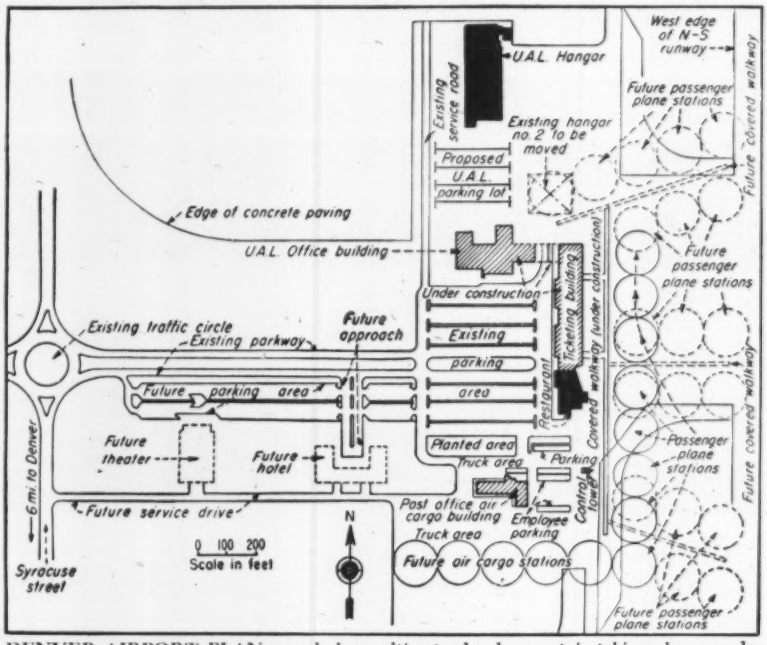
This middle-of-the-road policy—as between an extensive layout of temporary facilities and going into debt for immediate construction of permanent plant—has paid handsome dividends in the opinion of Denver authorities. Neither do they have a lot

of decaying temporary facilities that have to be replaced all at once, nor a permanent layout frozen to a pattern that does not fit the needs of today's aviation.

Instead, they have been able to provide Continental Airlines with a home office when it required one. They are building a large building to be leased to United Air Lines for its national operational headquarters. They have a restaurant building with large lounge rooms and terraces, where passengers and sightseers can eat in comfort. They have a new control tower built to handle not only the present 400-plane movements a day of Continental, United, Braniff, Frontier and Western airlines, but a 100% increase in traffic.

The eight present loading stations for passenger planes can also be expanded to 20 and perhaps to 22, in a layout already determined, before the field reaches capacity; in addition, space is provided for five cargo plane stations adjacent to the new air cargo and post office building. Likewise the new ticketing building, contract for which was let last July, will be large enough to serve the ultimate capacity of the field. Auto parking facilities are available for all present needs, and can readily be expanded more than 100%.

For the future, there remains the reconstruction of the central section of the administrative building layout, tying together the present restaurant and the new ticketing building. In conjunction with the new United Air Lines office building this will provide a continuous L-shaped structure housing all operational facilities except the control tower and the post office and air cargo building, both of which have just been completed to the south of the main building. Sites have also been reserved between the field and the entrance to the main highway for a hotel and for a theater. And plans are being discussed for building a golf course on land in the airplane approach zone of the field, now leased to a wheat farmer.



DENVER AIRPORT PLAN reveals how ultimate development is taking shape under a present building program that will provide facilities among the best in the country.

• **Modernized runways**—The layout and load-carrying capacity of the runways at Stapleton Field have likewise been brought up to the standards required to handle the largest planes now in use. The runways, in fact, received the first attention when the modernization plan was begun in 1947. At that time the field had main north-south and east-west runways as well as two diagonal runways. The main runways were in bad shape and hazardous, and the diagonal runways, even though built last and thus basically good, required a seal coat and some shoulder grading to assure better drainage.

Construction was immediately undertaken to bring the main runways up to capacity for 120,000-lb planes, with one of them slated to be extended to 10,000 ft. The diagonal runways were to be made adequate for 75,000-lb loads only, since they are only needed for the smaller planes that cannot land with a cross-wind component of 45 deg as can the large aircraft.

The diagonal runways, consisting of a 2-in. asphaltic wearing surface on a 9-in. macadam base were adequate for the 75,000-lb loads and needed only new seal coats. The main runways, however, were not safe for much over 20,000 lb and required major reconstruction.

The decision was to rebuild the north-south asphaltic concrete runway along its existing length of 7,000 ft, and then to build an entirely new runway 900 ft south of the existing east-west runway. A new east-west runway in this new location would permit abandonment of the old east-west runway, which interfered with planned expansion of the terminal area, and it also permits a length of 10,000 ft to be attained. Theoretically this long runway should be in the north-south direction, from a wind and operational efficiency standpoint, but residences at the south end and a valley at the north end made such a scheme impracticable. Since a long runway is required only under high temperature conditions when there is little wind, the east-west alignment is not at a disadvantage from a wind standpoint. It does require a much longer taxiing run, but this was a shortcoming that had to be faced.

In rebuilding the north-south runway, stage construction was adopted. Thus the base was built to the ultimate requirements of 120,000-lb loads—a 10-in. crushed aggregate course on a granular subbase varying from 5 to 15 in. The asphaltic concrete wearing surface was, however,

HOW DENVER AIRPORT IS BEING FINANCED

Terminal area	
Revenue bonds	$1,750,000
Federal participation	1,100,000
General fund, appropriation from general obligation bonds	689,700
Total	$3,539,700
Runways, auto parking, roads, etc.	
General fund, appropriation from general obligation bonds	$638,200
Federal participation	727,600
Total	$1,365,800

limited to a 3 in. thickness, good for gross loads somewhat over 90,000 lb. The surface can be brought up to the 120,000-lb standard by the addition of another inch of asphaltic concrete.

The new east-west runway was built to the 120,000-lb requirement throughout. At first its length was limited to 8,500 ft, but the extension to 10,000 ft was completed last month. Stapleton Field has more need for long runways than many other fields because it is located at an altitude of 5,298 ft.

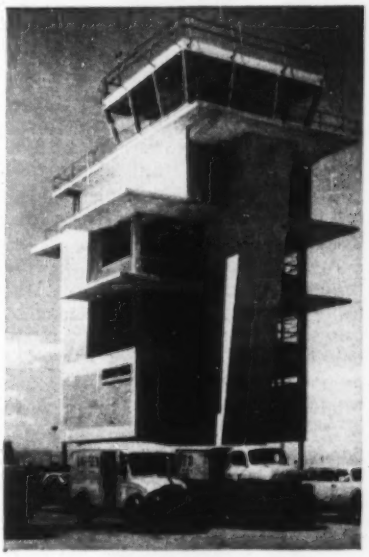
Installation this summer of high-intensity lighting and the most modern all-weather landing system, as represented by the new control tower, completes the present field expansion program.

• **Separate control tower**—The latest new facility at the airport is a new control tower opened this past summer. In contrast to most such towers, which are on top of the administration building—as was the old one at Denver—the new tower is a separate structure located about 200 ft away from the nearest other building. It is also ultra-modern both in its layout and its architectural aspect.

Rising 58 ft above the ground, the tower contains six stories. The ground floor is devoted to a standby power generating plant. The radar engineer and his equipment are located on the second floor while the third floor is completely devoted to equipment of various kinds. On the fourth floor is the controller's office and some storage space, while a windowless fifth floor is occupied by an air-conditioning room and a junction room for the many electrical cables. The sixth floor is the glass-enclosed control cab. The upper three floors are air conditioned.

Two shafts are attached outside the 31.5 x 28-ft plan dimensions of the control tower. The one on the back, about 7 x 14 ft in plan, accommodates the stairwell, while a smaller one on the east or field side is a conduit shaft. The latter, only about 5 x 6 ft at its base, is given an outward-sloping front face for architectural appearance, so that it has a size of about 11 x 6 ft at the top where it connects with the junction room floor. To achieve this effect the outer corner columns of the shaft are inclined outward and held in this position by ties at each floor level.

The control tower frame is of structural steel while an unusual number of other materials are used for other elements, both for functional efficiency and to enhance the architectural interest of the structure. The



NEW CONTROL TOWER symbolizes the modern character of Stapleton Field.

floors are of reinforced concrete. The concrete fireproofing over the steel is exposed on exterior walls outlining the spandrel beams and the corner columns. Cantilevered concrete sunshades are used above the windows of the third and fourth floors. The roof decks at the fifth and sixth floors are also extended as concrete cantilevers. The exterior panel walls of the first four floors are brick, painted to harmonize with all other new construction in the terminal area, while those of the stairwell are of random flagstone except for the west elevation which has steel sash glazed with obscure glass for its full height. Metal panels are used to enclose the windowless fifth story.

Up to window height the control cab is also enclosed in insulated metal panels. Its steel roof deck, cork-insulated and surfaced with built-up roofing, is supported by the aluminum framing of the windows which are equipped with double glazing and sloped outward for best visibility.

• **Other buildings**—The general structural and architectural pattern followed in the control building—structural steel frame, concrete floors, cellular steel roof decks, roof overhangs and enclosure walls of a combination of materials—reflects that used on most of the other buildings of the airport. An exception is the new United Air Lines office building, which is being built with a reinforced concrete frame.

As shown in the accompanying drawing, all of the airport buildings are connected to form a continuous L-shaped structure. The UAL office building is at one end of the L, the restaurant at the other. Between are a ticketing building (contract for which was let this summer), a central administration and waiting room building (temporary and to be replaced in 1953), and finally the restaurant.

All of these buildings, except the one where tickets will be sold and at which passengers will arrive and depart, are two stories. Provision will be made to make the ticketing building two stories, so that when some sort of standardization occurs in the height and location of airplane doors, passenger movements can be concentrated on the higher level. Such an arrangement is recognized as the ideal, so as to remove passengers from the necessary ground traffic of fuel and service trucks, but is impracticable now because of the diverse requirements of different planes and different air lines.

• **Covered walkways**—For passenger protection, covered walkways are being built along the edge of the field and connected to the ticketing building and public space in the central administration building. These walkways will presently afford passenger access to any one of eight plane loading berths. When growth in plane traffic demands, three finger walkways will be built out at right angles to the existing walkway, and the plane loading berths rearranged along them.

• **Bored caisson foundation**—The only construction problem encountered in building the Stapleton Field buildings has been in the foundations. Spread footings to support safely 4,000 psf were investigated, but core borings and load tests showed that the material, above a sandstone at 22 to 25-ft depth, was a silty and sandy clay that failed under a 2,000 psf loading. Under these circumstances only an expensive continuous concrete mat foundation would have sufficed.

Any idea of spread footings, therefore, was abandoned. Instead it was decided to employ plain concrete caissons having bell bottoms penetrating into the sandstone layer and a soapstone layer below it. Caisson design would also eliminate trouble with a 7-ft depth of water-bearing material directly above the sandstone.

Three of these belled caissons were installed before further investigation revealed that the bearing value of the sandstone and soapstone formation

was so great (120,000 psf) that the bell bottoms were not necessary. The caissons were then redesigned and the remainder put in as straight cylinders. The design load is about 22,000 psf.

The holes were excavated down to sandstone by the use of hole boring rigs equipped with spinning buckets and augers. Immediately after the holes were cleaned out a steel shell of caisson diameter with a sawtooth bottom edge was inserted and rapidly spun down to at least 2 ft into the soapstone before water could enter in any quantity. This minimum amount of water was then pumped out and concreting carried on rapidly to a safe point above water level. The steel shells were progressively withdrawn as the concreting progressed to the surface so that the finished foundations bear against the soil for their full depth.

Approximately 145 caissons from 30 to 52 in. in diam were placed under the office building. Cost studies indicate that the foundation work was accomplished at a substantial net saving compared to the estimated cost of normal spread footings.

Inasmuch as the ticketing building connects to the office building, the caisson method is being followed there also, with caisson diameters varying from 24 to 52 in. The post office and air cargo building is supported upon 24 in. diam concrete caissons but they penetrate only into a fairly good clay formation since this is a one story structure. And since soil of good bearing value was encountered under the control tower, spread footings are used successfully there.

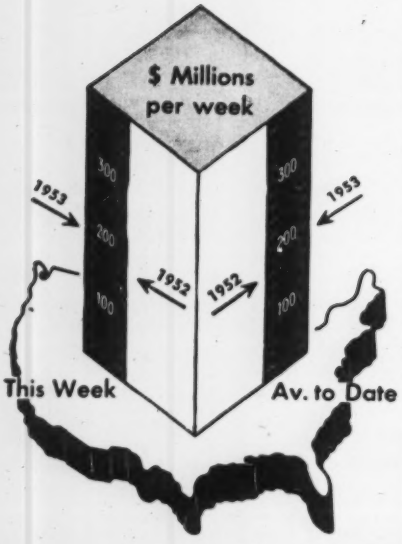
By the end of 1953, Stapleton Field will have more than adequate facilities to serve its air traffic.

And in all of this planning the controlling concept is to finance the facilities by revenue bonds secured by the earnings of the facilities themselves. This is true even though a proposal on the ballot, Nov. 4, which would have authorized the city to issue $3.5 million more in revenue bonds to finance the construction of two large hangars, was defeated. Inasmuch as all other city and state proposals for additional direct or indirect public debt were also defeated, the result is regarded as merely a temporary setback. Those in a position to know believe that when Denver citizens are fully educated in the use of revenue bonds at Stapleton Field, the issue will be approved.

G. Meredith Musick, a practicing architect in Denver, is in charge of all building planning and construction at the airport. The runways were redesigned and built under the supervision of Alfred J. Ryan.

Activity This Week

As reported to ENR (in millions of dollars)



Contracts by type of work

	This Week*	Cumulative 1 wk 1953	Cumulative 1 wk 1952†	% chge
Waterworks	$4.7	$4.7	$10.1	−52
Sewerage	4.0	4.0	4.7	−15
Bridges	2.5	2.5	5.8	−57
Highways	36.4	36.4	19.2	+90
Earthwork, waterways	2.3	2.3	4.1	−44
Buildings:				
Public	24.2	24.2	32.5	−26
Housg., pub.	12.0	12.0	4.4	+173
Housg., priv.	52.6	52.6	21.0	+150
Commercial	9.4	9.4	4.6	+104
Industrial	20.1	20.1	39.1	−49
Unclassified	16.8	16.8	13.7	+23
Total	**$185.0**	**$185.0**	**$159.1**	**+16**

* 3-day week
† 4-day week

NOTE: Minimum size projects included are: Waterworks and waterway projects, $34,000; other public works, $60,000; industrial buildings, $82,000; other buildings, $300,000.

ENR indexes		Base Year = 100 1913	1926	1949
Constr. cost	Dec.	587.49	282.41	123.16
	Nov.	588.61	282.94	123.39
Bldg. cost	Dec.	425.26	229.70*	120.79
	Nov.	426.04	230.30	121.10
Volume	Nov.	504	205	146

* Revised

OFFICIAL PROPOSALS

Bids: January 14, 1953

Contact C-15-B

NOTICE TO BIDDERS

Sealed proposals will be received by the Ohio Turnpike Commission for the performance of Contract C-15-B. The work covered by this Contract consists generally of the construction of the superstructure for twin bridges over the Cuyahoga River in Summit County, Ohio, total length 2682'-3" c-c of bearings of abutments 13 spans (9 deck truss spans @ 250 feet and 4 deck girder spans @ 100 feet) Stations 256+40.27 to 288+30. The superstructure is to be built on piers and abutments now under construction in accordance with Ohio Turnpike Commission Contract No. C-15-A.

Approximate quantities of the major items for said construction are as follows:

6,500 Cu. Yds. Class "C" Concrete for Structures
2,165,000 Lbs. Reinforcing Steel
2,000,000 Lbs. Structural Steel in Girder Spans
15,400,000 Lbs. Structural Steel in Truss Spans
11,000 Ft. Railing

Copies of the Plans and Specifications for said Contract are available for public inspection or purchase at the office of the Chief Engineer, Ohio Turnpike Commission, 361 East Broad Street, Columbus 15, Ohio. These documents may be purchased from the Chief Engineer of the Ohio Turnpike Commission for the following sums, which sums are non-returnable:

General Specifications $5.00 per set
Plans and other Contract Documents (excluding the General Specifications) $3.00 per set

Copies of the Proposal, Affidavit, Notice to Bidders, Special Provisions, and other Contract Documents will be available at the office of the Chief Engineer, Ohio Turnpike Commission, not later than December 30, 1952.

All proposals must be on the form prescribed by the Commission and must comply with the terms and conditions set forth in the Contract Documents.

Each proposal must be accompanied by a certified check on a solvent bank, payable to the order of the Ohio Turnpike Commission, in an amount not less than 5% of the total amount bid in said proposal. Said certified check will be held by the Commission as a guarantee that, if the proposal is accepted, a contract will be entered into and the performance of the proposal will be secured.

All bids must be received on or before 10:00 o'clock A.M., Eastern Standard Time, January 14, 1953, in the offices of the Ohio Turnpike Commission, 361 East Broad Street, Columbus 15, Ohio.

Immediately after the closing of bids, the bid box will be removed to the Neil House Hotel, 41 South High Street, Columbus Ohio, where the bids will be publicly opened and read.

The award of the contract, if it be awarded, will be to the lowest and best bidder whose proposal complies with all prescribed requirements. The Commission reserves the right to reject any and all proposals and to waive technicalities.

OHIO TURNPIKE COMMISSION

C. C.—12-(19-26)-52
A.B.J.—12-(20-27)-52
Eng. N-R-12/25/52—1/1/53

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-3863) will be received at Grants Pass, Oregon, until 10 a.m., PST, January 20, 1953, for furnishing labor and materials for Savage Rapids Dam rehabilitation, Grants Pass Project, Oregon. Location: About 6 miles east of Grants Pass, Oregon. Principal items are: 1,400 cu. yds. excavation; 1,800 cu. yds. concrete; installing 328,800 pounds gates, hoists, stop-logs, and miscellaneous metalwork; and other work. Completion time 830 days. For particulars, address Bureau of Reclamation, Bend, Oregon; or Building 53, Denver Federal Center, Denver, Colorado.

MICHAEL W. STRAUS, Commissioner

OFFICIAL PROPOSALS
(Continued from page 60)

Bids: December 30, 1952

New York State Road Work

NOTICE TO CONTRACTORS: STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.,—Pursuant to the provisions of the Highway Law, and Article 2, Title 9 of the Public Authorities Law, and special provisions for projects financed with Federal Aid funds, sealed proposals will be received until ten-thirty o'clock A.M., eastern standard time on the 30th day of December, 1952, by Henry A. Cohen, Director, Bureau of Contracts and Accounts, 14th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for the following projects:

County	Contract No.	Name	Miles	Type	Deposit	Estimated Cost of Work
		DISTRICT No. 1				
		G. L. Nickerson, District Engineer, 353 Broadway, Albany, New York				
Schenectady	M. T. 52-18 S. T. 52-35 R. C. 52-123	New York State Thruway-Mohawk Sect., Subd. 1 (Mont. Co. L. Gregg Rd.) Co. Rd. 29R; Crawford Rd.; Gregg Rd.; Camp Pattersonville Rd.; Rotterdam Water Tower Access Rd.; Pattersonville Scotch Church S. H. 1482	Thy. 4.77 Acc. 1.50	9" Cem. Conc. Pavt. 2 @ 25' Wide=4.77 Mi. Bit. Mac. Ty. 1=1.07 Mi. Found. Crse. Grav.=0.43 Mi. Gr. Sep. Alpha I-Beam 145.3' Gr. Sep. Alpha I-Beam 227' Gr. Sep. Rigid Fr. 31' Alpha I-Beam Bridge 51.8' Conc. Twin Box Bridge 24'	$244,000 Plans $100	$4,428,000
		DISTRICT No. 3				
		William Robinson, District Engineer, Weigh Lock Bldg., Syracuse, New York				
Cayuga & Onondaga	O. T. 52-21P	New York State Thruway-Ontario Section, Subd. 5A, 5B (Port Byron-Jordan); Weedsport Interchange	Thy. 6.52 Acc. 1.33	9" Cem. Conc. Pavt. 2 @ 25' Var. Wide=7.82 Mi. Found. Crse. Grav.=0.03 Mi. Gr. Sep. Alpha I-Beam 206.6'	109,000 Plans $25	1,989,000
		DISTRICT No. 4				
		J. P. Larsen, District Engineer, Barge Canal Terminal, Rochester, New York				
Monroe	O. T. 52-24 R. C. 52-121	New York State Thruway-Ontario Sect., Subd. 8B&9 (Rochester So.-Route US 15 Interchange); West Henrietta-Rochester S. H. 62	Thy. 2.52 Acc. 0.77	9" Cem. Conc. Pavt. Var. Wide=3.22 Mi. Found. Crse. Grav.=0.03 Mi. Grading=0.04 Mi. Gr. Sep. Alpha I-Beam 210'	35,000 Plans $15	637,000
		DISTRICT No. 7				
		C. C. Cassel, District Engineer, 444 Van Duzee St., Watertown, New York				
Franklin	FARC 52-118 R. C. 52-119	Saranac Lake Village: Broadway & River Sts. S. H. 1222 Saranac Lake–Lake Clear Junction Pt. 1 S. H. 1090 Proj. U-644(3)	1.80	Asph. Conc. Ty. 1A Opt.	16,000 Plans $10	281,000
Jefferson	FAC 52-17	West Main St.: City of Watertown Proj. U-1106(1)	0.75	Asph. Conc. Ty. 1A Opt.=0.71 Mi. Misc. Work=0.04 Mi.	20,000 Plans $15	386,000
		DISTRICT No. 10				
		J. J. Darcy, District Engineer, Montauk Highway, Babylon, Long Island, New York				
	FAMDE 52-5	Major Deegan Expressway Contract 6 Project U-1082(12)	1.29 Exp. 0.28 Acc.	Grading Drainage & Misc. Work = 1.29 Mi. Sheet Asp. Pavt. = 0.12 Mi. Cem. Conc. Pavt. = 0.16 Mi. Hy. Sep. Alpha I-Beam 119.69' Hy. Sep. Alpha I-Beam 98.55'	415,000 Plans $100	7,505,000
Bronx	FAMDE 52-6	Major Deegan Expressway (Contract 13) (Interchang at Grand Concourse) Proj. U-1082(6)	1.22	Granite Block Pavt=0.19 Mi. 9" Cem. Conc. Pavt. 2 @ 32' Wide=0.88 Mi. Misc. Work=0.15 Mi. Gr. Sep. Alpha I-Beam 167'	100,000 Plans $50	1,750,000

Maps, plans, specifications and proposed forms may be seen and obtained at the office of the State Department of Public Works, Bureau of Contracts and Accounts, Albany, N. Y., and at the office of the District Engineers noted above, and may also be seen at the office of the State Department of Public Works, 270 Broadway, New York City.

The deposit for Plans and Proposal Forms for each contract is indicated above. A refund will be made in full to bidders for return of one set, in good condition, within 30 days of award, or rejection of bids; refund for all other sets in good condition, similar period, will be 50% of deposit.

Special attention of bidders is called to "General Information for Bidders" in the proposal, specification, and contract agreement, and to the special provisions applying to projects financed with federal funds. Award of a contract is subject to the "Controlled Materials Plan" of the National Production Authority as well as to regulations issued thereunder.

Proposal for each contract must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check payable to the order of the "State of New York, Commissioner of Taxation and Finance" for the sum as specified in the advertisement and the proposal. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Highway Law, as set forth in "Instructions to Bidders."

When optional types are permitted on contracts with federal funds, bidders must state in the space provided in the proposal the exact designation of the optional type upon which the proposal is predicated.

The right is reserved to reject any or all bids.

B. D. TALLAMY
SUPT. OF PUBLIC WORKS

U. S. Government

"St. Louis District Corps of Engineers, 420 Locust, St. Louis 2, Missouri. Sealed bids received until 8 January 1953 for constructing 300 relief wells in Monroe and Randolph Counties, Illinois. Invitation to bid or additional information furnished upon request."

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OFFICIAL PROPOSALS

Bids: April 30, 1952

IRAQ GOVERNMENT-DEVELOPMENT BOARD

ROAD BRIDGES AT BAGHDAD

1. Tenders are invited by the Development Board of the Government of Iraq for the construction of two Road Bridges over the River Tigris at Baghdad and works in connection therewith.

2. The Contract Documents and Instructions as to tendering for the first bridge, i.e. South Gate Bridge, may be inspected on and after the 1st day of January, 1953, at any of the following places, namely:—

(a) The offices of the Development Board, Bagdad.
(b) The Iraqi Embassy, Washington, D. C., U. S. A.
(c) The Royal Iraqi Legation, Paris.
(d) The Royal Iraqi Legation, Brussels.
(e) The Royal Iraqi Legation, Rome.
(f) The offices of Messrs. Coode & Partners, 9, Victoria Street, London, S.W.1, England.

Similar documents for the second bridge, i.e. Adhamiyah Bridge, will be available after the 16th day of February, 1953.

3. Firms desiring to tender may obtain copies of the Contract Documents for the first bridge between the 1st day of January, 1953 and the 31st day of March, 1953, and for the second bridge on or after the 16th day of February, 1953 and until the 31st day of March, 1953, from either the Development Board in Baghdad, or Messrs. Coode & Partners in London upon payment of Twenty-five Iraqi Dinars or of Twenty-five pounds sterling for each set of documents.

4. Tenders must be accompanied by a deposit of I.D.10,000 (Ten thousand Iraqi Dinars) for each bridge or the equivalent in pounds Sterling, to be made at the Rafidain Bank, Baghdad, or at its London Agents, The Midland Bank, Overseas Branch, 122, Old Broad Street, London, E.C.2. Full detailed conditions as to this deposit may be ascertained from the "Instructions to Persons Tendering" attached to the Contract Documents.

5. Tenders for one or both bridges must be submitted to the Development Board, Baghdad, and will be received up to noon on the 30th day April, 1953.

6. Particular attention is drawn to Article 22 of the Instructions to Persons Tendering, namely, that tenders will only be accepted from firms of Contractors who have previously executed works of a similar nature and magnitude.

Secretary General,
Development Board.

Baghdad.

U. S. Government

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-3861) will be received at Kirwin, Kansas, until 10 a.m. January 22, 1953, for furnishing labor and materials for earthwork, structures, and track relocation of Missouri Pacific Railroad, Kirwin Dam, Missouri River Basin Project. Location: Near Kirwin, Kansas. Principal items are: 1,106,000 cu. yds. of excavation; 35,000 c. yds. of ballast and sub-ballast; laying 9.65 miles of track; 2,840 cu. yds. of concrete; and other work. Completion time 270 days. For particulars, address Bureau of Reclamation, Kirwin, Kansas; or Building 53, Denver Federal Center, Denver, Colorado.

MICHAEL W. STRAUS, Commissioner

UNITED STATES DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-3860) will be received at Maxwell, New Mexico, until 10 a.m. January 20, 1953, for furnishing labor and materials for dams and dike for reservoir rehabilitation, Vermejo Project, New Mexico. Location: 5 miles northwest of Maxwell, New Mexico. Principal items are: 196,000 cu. yds. of foundation excavation for dams and structures; 1,137,000 cu. yds. of borrow pit excavation for embankments; 500 cu. yds. of concrete; and other work. Completion time 720 days. For particulars, address Bureau of Reclamation, Maxwell, New Mexico; or Building 53, Denver Federal Center, Denver, Colorado.

MICHAEL W. STRAUS, Commissioner

SEARCHLIGHT SECTION

(Classified Advertising)

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P-6338, Engineering News-Record
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P-6238, Engineering News-Record
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BRIDGE DESIGN Engineers and Draftsmen. Experience in highway bridge design and preparation of contract drawings for expressway work. Furnish full information regarding education, experience, age, references and salary required. Replies confidential. Associated Consulting Engineers, 1606 Kelly Ave., Baltimore 9, Maryland.

DRAFTSMEN STRUCTURAL Steel Detailers and Checkers. Long range work—top rates, experienced men only (2 yrs. min.). Send resume of work history, experience, etc. Charles Cohn & Son, 614 Glenn Bldg., Atlanta, Georgia.

ENGINEERS EXPERIENCED in water and sewage works projects or related fields. Opportunity for permanent connection with long established consulting firm. Please state full qualifications, experience and salary requirements. Location Ohio. P-6229, Engineering News-Record.

ESTIMATOR QUALIFIED all types of General Construction Take Off for General Contractor in Metropolitan Area. Telephone N.J.-Elizabeth 2-2247.

EXPERIENCED MAN for structural steel detailing, checking, or estimating. Send name, address, and list of qualifications to: Fabricated Steel Products of Indiana, Inc., 2025 South Main St., South Bend 14, Indiana.

GENERAL SUPERINTENDENT, capable of taking complete charge of operations for large northwest contractor. Must be an aggressive, experienced organizer—cost conscious. Excellent opportunity, salary open to right man—profit sharing. Send complete resume of experience, training, personal data, salary expected, etc., to P-6332, Engineering News-Record.

LARGE, WELL established Contractor in the Middle West, has a permanent position open for a building Construction Supt. to construct Schools, Churches, Hospitals, & Office Bldgs. We do not want an office executive for this job, but rather a practical man who has actually built things and has the know how acquired from experience. State work history, age, and approximate salary requirements. P-6326, Engineering News-Record.

PROJECT MANAGER or General Construction Supt., 47, Civil Engineer, 25 years construction experience, water and Sewerage systems, Multiple story bldg., Commercial and Water front, Highways and Bridges. Sober, aggressive and reliable. P-6409, Engineering News-Record.

WANTED BY General Contractors in Detroit area—A CE with college degree and some graduate work to do all phases of work in architectural, mechanical and electrical trades (Layout, Supervision, Expediting, Detailing and Estimates). Must have at least four years of field experience and under 35. $110 per week. Write details to P-6375, Engineering News-Record.

SELLING OPPORTUNITY OFFERED

DESIRED: LIVE Wire district distributors for natural rubber crumb and latex for rubber roads program. Firms, or individuals, close to state, county and city highway departments as suppliers preferred. For negotiation, please furnish pertinent information, your organization, and territory covered in first letter. RW-6477, Engineering News-Record.

POSITIONS WANTED

ACCOUNTANT—10 years heavy construction field experience. Complete responsibility all phases, costs, payroll, purchasing, etc. Interested New Jersey area. PW-6401, Engineering News-Record.

CIVIL ENGINEER. Age 30. B.S. degree, N.Y. State Professional Engineers License. 6 yrs. experience including buildings, foundations, plants, drainage, rail spurs. Desires position with consulting or Contracting firm with opportunity for increasing responsibility and eventual profit-sharing participation. PW-6410, Engineering News-Record.

CONSTRUCTION SUPERINTENDENT, nineteen years practical experience all types buildings, heavy construction, bridges, etc., honest, sober and producer, family man but will leave for right proposition, available 30 to 60 days. PW-6366, Engineering News-Record.

CONSTRUCTION SUPERINTENDENT, Age 38. Paper Mills, Power Houses, Large housing projects. Experience six paper mills, eight power houses, three housing projects. Reference on request. Available January 5th., 1953, Cfo. PW-6365, Engineering News-Record.

EXECUTIVE ENGINEER, long experience, management large company, heavy construction docks, foundations, tunnels, difficult subaqueous structures, etc. PW-5428, Engineering News-Record.

WORK WANTED

FIELD WORK and plans on: Electrical transmission, Highway, water and sewer systems. Wilson Engineering Co., Glasgow, Ky.

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Will arrange thru purchase of (1) Capital stock, (2) Assets, (3) Machinery and equipment, whole or in part—Personnel usually retained, strict confidence. Box 1351, Church St. Sta., New York 8, N. Y.

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With experience on design for commercial and industrial buildings, including chemical plants, power plants and laboratories.

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Openings in Cleveland offer lengthy employment with good salary for those qualifying.

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Arthur G. McKee & Company has openings in their Cleveland, Ohio office for men experienced in Oil Refinery design as:

PIPING DESIGNERS
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Permanent positions.
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No age limitations.

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An Alert Mechanical Engineer with Some Knowledge of Electrical Engineering . . . Must Be a Good Calculator . . .

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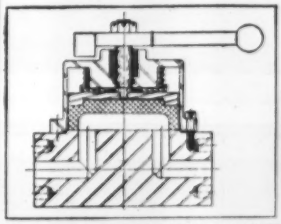

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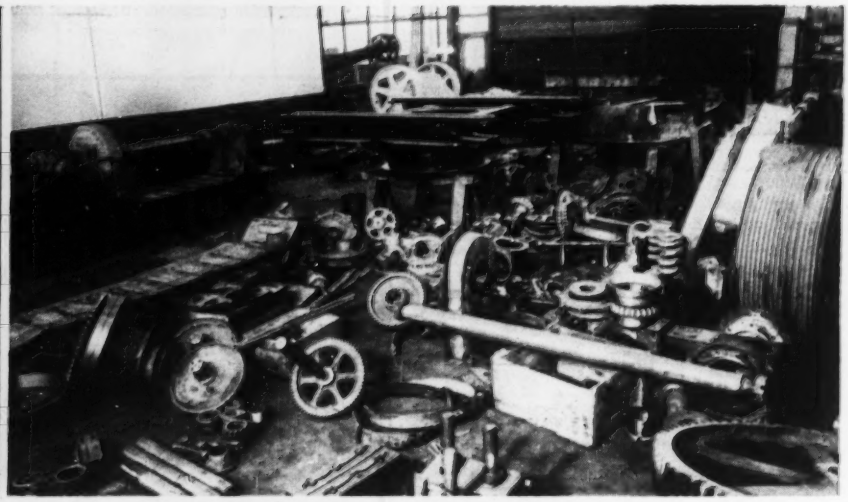
L. B. SMITH starts rebuilding used equipment, it is necessary to *completely* dismantle it . . . as was the case illustrated here. Skilled workers, manning the latest and most modern machines, using standard bushings, standard shafts, standard factory parts, perform our rebuilding jobs with doctor-like thoroughness!



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can be done on your equipment, too!!!

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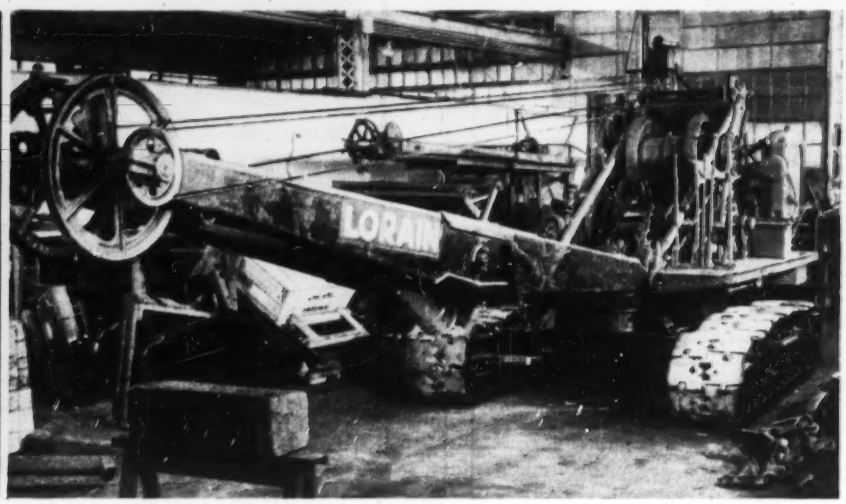
L. B. SMITH rebuilds equipment, it is ready for many years of further use. Wherever possible, new design is incorporated into the rebuilt machine, increasing the productive capacity. And, since under and oversizing shafts, bearings, etc. is frowned upon, no trouble is experienced in future maintenance.



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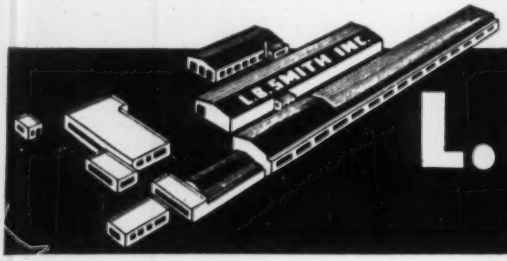
Have you equipment we can rebuild? You are invited to use our facilities — the world's largest equipment rebuilding facilities . . . where rebuilding is a business — with over 25 years of experience on all types of construction equipment — where trained mechanics with precision tools — can build back into your equipment many years of additional and efficient usefulness — using the same thoroughness employed in rebuilding our own used equipment. Write today



L. B. SMITH INC.

CAMP HILL, SUBURB OF HARRISBURG, PA.

L. B. SMITH INC.

New and Used Equipment News

Prepared Monthly by Ed Woolford at Camp Hill, Pa.

VOL. 1 NO. 10

AIR COMPRESSORS

Gardner-Denver 500 cu. ft. diesel, new condition.
Gardner-Denver 500 cu. ft. diesel, good operating condition.
Schramm 105 cubic foot gas powered compressor on 4 steel wheels.
Worthington two-stage, water-cooled, vertical 250#, 60 CFM, new condition.
Paving breakers, jackhammers, wagon drills, tie tampers.

QUARRY EQUIPMENT & BINS

2540 Cedarapids AAAA primary unit on rubber, diesel power. Rebuilt.
2036 Cedarapids AAA primary unit on rubber, diesel power. Rebuilt.
1036/2418 Cedarapids Jr. Tandem unit on rubber.
Cedarapids Rock-It plant w/2025 jaw, 3033 hammermill. New.
1236 Cedarapids Model 6C plant. New.
4033 Cedarapids Model 6C plant. New.
2020 Cedarapids double impeller. New condition.
4024 Cedarapids roll. Rebuilt.
3018 Cedarapids roll. Rebuilt.
1236 Cedarapids twin jaw crusher. New.
10x7 Allis Chalmers lake type jaw crusher. Rebuilt.
#1 Cedarapids Kubit impact breaker. New condition.
B-3 Jeffrey swing hammer pulverizer. Rebuilt.
36" x 14' apron feeder.
42" x 10' Cedarapids feeder.
4' x 6' Kennedy Van Saun single deck screen.
3' x 6' Kennedy Van Saun triple deck screen.
60" dia. x 14' long Traylor revolving screen. Rebuilt.
36" Wemco single pitch sand screw. New condition.
15 cu. yd. Cedarapids sand drag. New.
16" x 90' bucket elevator.
60-ton, 2-compartment, 8' x 18' storage bin w/clam gates.
100-ton, 2 compartment, 13'x23' storage bin.
Special bins to your specifications.
Conveyors—18"—24"—30"—36". Also belt.

TRUCKS—TRAILERS

27FD Euclid rear dumps.
28FD Euclid rear dumps.
1½-ton Ford with any body.
2000-gallon tanks on semi-trailer mounting.
New and rebuilt dump bodies.

GENERATORS & LIGHT PLANTS

1½ KW to 125 KW, alternating and direct current gasoline and diesel powered.

SHOVELS—CRANES

Lorain 75, 1¼-yd. diesel.
Lorain 40 truck crane on Mack 3-axle truck.
Lorain TL, ¾-yd. diesel. Any front.
Unit 514, ½-yd. gasoline crawler shovel. Good condition.
Osgood 200, ½-yd. gas hoe.

SHOVEL & CRANE ATTACHMENTS

Lorain L-41 Chain Crowd Shovel Attachment. Rebuilt.
Lorain 40 Hi-Lift shovel attachment.
P&H 203 shovel attachment.
Chain crowd Lorain 30A shovel attachment.
Bucyrus-Erie 1½-yd. rock bucket.
McCaffrey Model 648 for 1¼ to 2-yd. crane.
McCaffrey Model 636 for ¾-yd. to 1-yd. crane.

BACKHOE BUCKETS & ATTACHMENTS

Lorain 30 hoe attachment complete.
¾-yd. Lorain, 40, LBS #6105, 44" cutting width.
¾-yd. Amsco 40" cutting width, LBS #8101.

CLAM—DRAG—SCRAPER BUCKETS

LIFTING MAGNETS

1—45" Ohio lifting magnet, rebuilt.

SHOVEL DIPPERS

Lorain 41, ¾-yd. LBS #8600, rebuilt.
New Lima 1-yd. Amsco, LBS #2295.
Bucyrus-Erie 1¼-yd. gas air, LBS #3782, fair.
Lorain 75B, 1½-yd. manganese bucket, LBS #8538.
Lorain 75B, 1¼-yd. extended lip, 1¾-yd. LBS #2260.
Pettibone-Mulliken 2-yd. Lorain 82 or 820, manganese, LBS #5361.
Pettibone-Mulliken 2-yd. for 3500 Manitowoc LBS #5783.
Esco 2½-yd. cast weld dipper with bail & teeth.

CONCRETE EQUIPMENT

Blaw-Knox gas-electric finisher, 10½'-12½', rebuilt.
Koehring 10'-12' finishers, rebuilt.
Cleveland formgrader, new 1944 rebuilt.
Corr formgrader, new 1944, rebuilt.

TRACTORS

TD-24 International with Bucyrus-Erie angle-blade.
TD9 International diesel with 1 yd. Loadover.
Model CR Tournapull w/16-yd. Model E16 Tournarocker, rebuilt.

WELL DRILLS & TOOLS

Sanderson-Cyclone #42 well drill, new.
Sanderson-Cyclone #44 well drill, new.
Bits—Stems—Bailers—Sockets—Etc.

Barber-Greene 44C Trenching machine 18" to 24" cutting width, 7' depth.

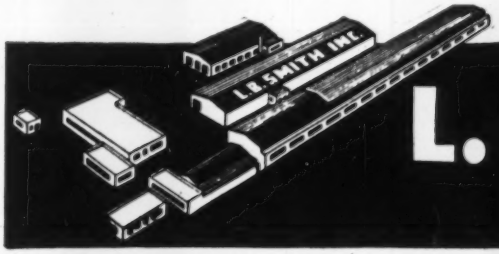
PUMPS

New Layne Bowler type 18 deep well pump with right angle gear drive. 3000 GPM at 120' TDH.
Used and rebuilt pumps, all sizes, gasoline, electric or diesel.

GASOLINE AND DIESEL ENGINES

Caterpillar D-13000, rebuilt.
Murphy ME-6, & ME-46, rebuilt.

***Phone* HARRISBURG, PA. 7-3431**



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A.C.—50 AND 60 CYCLES

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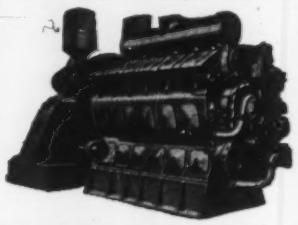

A PARTIAL LISTING OF OUR INVENTORY

KW	Make	Model	HP	RPM	KW	Make	Model	HP	RPM
1500	Fairbanks Morse	38E16	2000	300	320	Buckeye	80	480	600
1136	Fairbanks Morse	38D	1600	720	320	Enterprise	DSG-6	560	450
1100	General Motors	16-278A	1600	720	300	General Motors	8-268A	450	1200
1000	General Motors	16-567B	1440	720	250	Fairbanks Morse	27-E	375	360
750	General Motors	12-567	1080	720	200	General Motors	6-268A	250	900
500	Baldwin	VO-8	750	514	100	Worthington	HR-5	150	600
500	General Motors	8-278A	750	720	100	General Motors	8-268A	150	1200
500	General Motors	8-567	720	720	60	General Motors	6-71	90	1200
400	Ingersoll-Rand	8-8	600	720	30	Internat'l Harvester	UD-14	45	1200
350	Baldwin	VO-6	510	450					

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1—D8 Tractor with Bulldozer, new 1949, completely overhauled
1—D4 Tractor with Hydraulic Dozer—electric and/or diesel
1—Austin-Western Motor Grader
1—Oliver, Model 80, Rubber Tired Tractor
1—Model C Scoopmobile with 1 yard bucket
2—60 K.W. Diesel Generators
3—500 c.f.m. Ingersoll-Rand Portable Compressors
1—No. 2½ Kent 2 Hopper Mortar Mixer
2—Cement Guns, Size N-2, with Worthington Pump and necessary hose, nozzles, etc.
2—Single Drum, 40 H.P. Clyde Electric Hoists
24—1½ yard Blaw-Know, R-46, Concrete Buckets

Subject to prior sale

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P & H Model 1055 Diesel Shovel 3½ yds.
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Manitowac Mod. 3000 Diesel Crane, 70' BM.
Buc-Erie 120-B Electric Shovel: 5 yds.
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Northwest 80-D Diesel Shovel, rebuilt, 2½ yd.
Manitowac Mod 3500 Diesel Shovel.
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Koehring 304 Shovel ¾ yd. Rebuilt. Diesel.
P&H 855-B 1½ yd. Shovel-Crane-Drag. Diesel.
Lorain Mod. Mc-414 Moto-Crane 70 ft. Boom.

TRAXCAVATORS—PAYLOADERS

Cat. D-4 Tractor with Athey Mobile Loader.
Cat. DY and D7 Traxcavator. Rebuilt.
Hough Payloaders Models HLA, HFH, HE, HA.

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Erie 3 Comp. Agg., 400 bbl. Cement, 400 bbl. silo.
Large plant 212 yds., 6 compt., agg. and cement elevators, 56-S Mixer. Excellent.
Large plant 400 yds., 5 compt. with 2 yd. Koehring Mixers. Write for details.
Cement bin 400 bbls. with batcher. NEW.
Agg. bin. 100 tons 3 cpts. 2 yd. weighbatcher, NEW.

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Barber Greene Model 842 Utility Plant.
McCarter Iron Works Complete 3000# pug mill.
Cummer 1500 lbs. Semi-Port. Very good.
Std. 1500 lbs. Batch. Sts. Bit.
Simplicity Model S-100. Diesel powered.
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Steel Stiff leg Derrick 100 Ton 100' Boom.
Steel Stiff leg Derrick 25 Ton 80' Boom.
American 20 ton stiff leg derrick 90' boom.
Guy-Erectors 110' Mast 100' BM. 35 Tons.
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2—Koehring Tilting Mixers, 4 yds. Complete.
Smith 56S Tilting Mixer, 2 yds.
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2 Ransome 34-E Dual Drum Pavers Diesel.
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COMPRESSOR: Worthington DC2, 29/18-½ x 21, motor 600 H.P. synchronous, 440 volt, with all auxiliary equipment.

MINE HOISTS: Single and double drum 100 to 1500 H.P. with all electrical equipment. Complete specifications, drawings and photos available.

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65 ton G.E. Diesel Elec. Locomotive.
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1035 CFM I.R. Air Comprs. New 1949.

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NEW—USED AND TAKEOFFS

Suitable For All Types Of Construction Equipment

• Mobile Cranes • Low Bed • Mobile Compressors • Truck • Tractor
Regular Highway and Non-directional on and off the road type tires.

750/20— 8 ply un-used non-directional tires and tubes	$32.50
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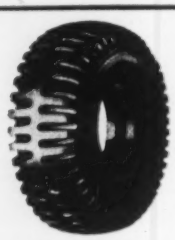

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1—20" Hydraulic Dredge

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ALL TRUSSES ARE FLAT, "BOX-TYPE", 7' HIGH ONE END, 6' OTHER END.

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1201 Lima Standard Shovel #4117; 3½ Yd. Dipper; Type L Cummins Deisel.

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Steel Deck Lighter
80'x28'x7'
Built 1949, price $16,000.00
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1—Rex 8" Pumpcrete with 1200 ft. pipe
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Also truck welders and tools
Complete list and prices mailed on request
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Used, complete. Northwest 1½ yd. shovel front. 85% new.
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10 Ton White 2500 Gallon Water Wagon Model 1064, Serial No. 301920—Rear Axle, Timken Model SD 353-W-X-7-Cummins HB Engine

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8—5 yard Side Dump Muck Cars
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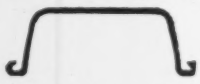

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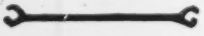

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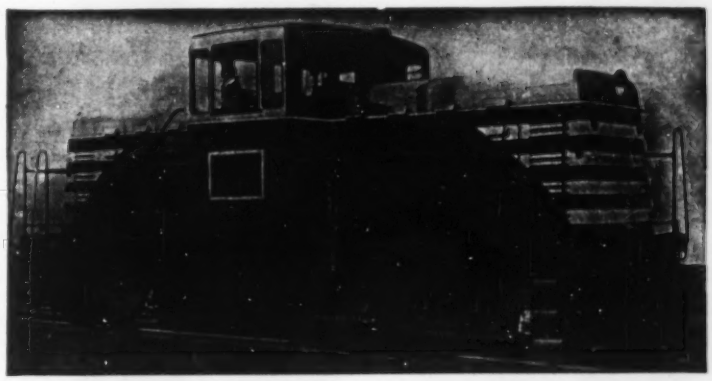

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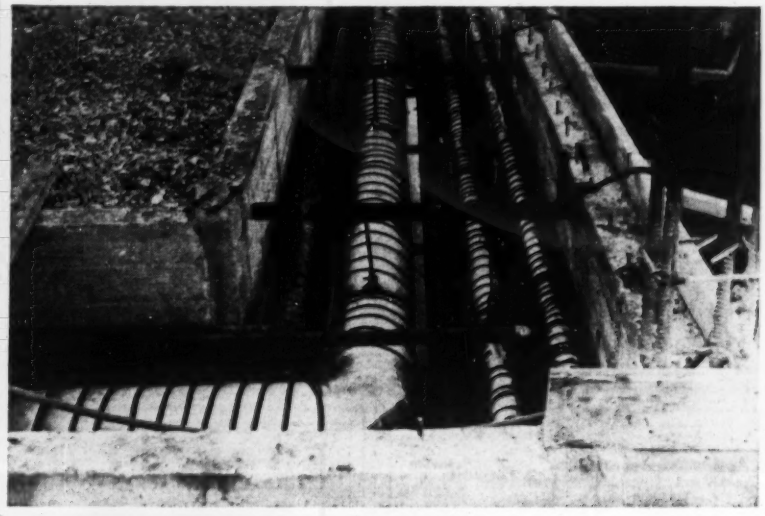


School piping insulated with Ultralite

Steam supply, steam return, hot and cold water pipes were all laid in place in an open concrete trench at the new Fayetteville, Ark., High School. After the joints were wiped clean and connections tightened and checked, the contractor used one-inch thick Ultralite glass fiber insulation (faced on one side with plastic film) and tied it in place at 10-ft intervals.

Next step was to take ½-in. wide Bauer and Black Polyken Tape No. 113, and, starting at one end, wind it spirally along the insulated pipe. In this manner all the pipes were thoroughly covered and protected from moisture and dampness. Angles and tees were made by cutting V's and U's in the insulation respectively at the turning point—then all joints were well sealed with the Polyken tape.

On smaller pipes (under 4 in.) No. 75 Ultralite was used since that size will flow around a small diameter more efficiently than the No. 200 type.

The problem was solved after a meeting of the Johnson Plumbing and Heating Co. of Fayetteville (contractors), the Ball Distributing and Engineering Co. and Collins and Gould, mechanical engineers for the project. The manufacturer claims that this job is typical of many which can be accomplished with its products and claims that it gives (1) top insulation efficiency, (2) competition in cost to cheapest insulations available, (3) perfect utility, since the same material is used on any size pipe and on any type surface, (4) fittings insulated as efficiently as the pipe itself. GUSTIN-BACON MANUFACTURING COMPANY, KANSAS CITY 6, MISSOURI.

Worker-owned plywood co. makes hardboard panels

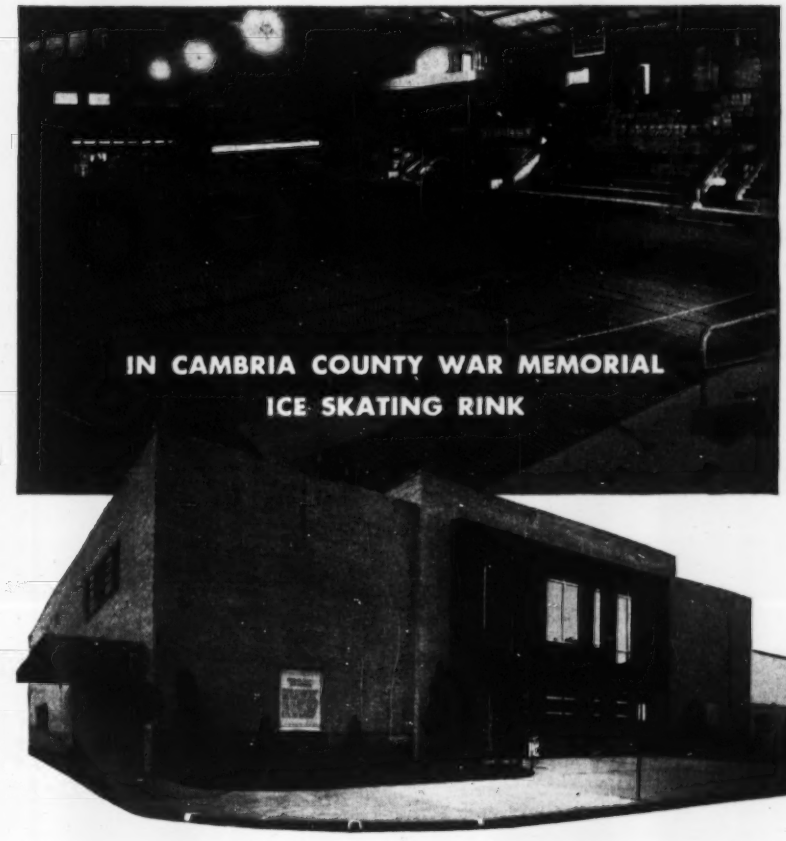
Anacortes Veneer, Inc., one of the largest worker-owned plywood firms in the Pacific Northwest, is starting volume production of its new high-strength hardboard panel called Armorboard.

Although it possesses a very high degree of shock resistance, Armorboard is so flexible that a ⅛-in. thick strip can be bent into a tight circle about the size of a hatband without cracking the surface, according to the manufacturer.

Armorboard is made in ⅛, 7/32 and ¼-in. thicknesses and has most of the physical properties of a treated board. The board's unusual resistance to impact makes it ideal for concrete forms on construction jobs. Its high flexibility is said to simplify forming problems involving sharply curved surfaces.

The new board supplements other Anacortes panel products which include exterior and interior Douglas fir plywood in standard grades and extra long-length panels marketed under the name Armorbond. The company also makes two grades of plastic-surfaced plywood widely known as Armoron—one for concrete forms and the other where high paintability is required. ANACORTES VENEER, INC., ANACORTES, WASH.

(*New Products continued on page 74*)



Wrought iron supply and return headers set in position.

Setting the insulation material before installing wrought iron pipe coils.

Wrought iron pipe lined up for joining with the headers.

Wrought iron pipes, placed on horses, ready for welding.

Covering installed coils of wrought iron pipe with concrete.

BYERS WROUGHT IRON PIPE

defends against corrosive attack along a 10-mile "FRONT"

Thoroughly familiar with the corrosive conditions which threaten the service life of ice rink floor piping, the designers of this Johnstown, Pa., indoor hockey and skating rink solved the problem of premature failure by specifying a durable pipe material. Ten miles of Byers Wrought Iron pipe was used in the refrigeration system. Downspouts, soil waste and vents are also safeguarded by this time-tested material.

Hunter, Caldwell & Campbell, Altoona, Pa., were the architects; H. F. Lenz, Johnstown, Pa., was the engineer; Ward Refrigeration & Engineering Co., Louisville, Ky., installed the skating rink, while A. J. Sloan Co., of Johnstown, Pa. installed the plumbing.

Our bulletin, WROUGHT IRON IN REFRIGERATION AND AIR CONDITIONING SYSTEMS, tells why genuine wrought iron is the number one choice for ice rink piping application. Write for your copy today.

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Scoopmobile Model C

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NEW PRODUCTS

Dodge and Timken combine to make steel pillow blocks

The result of pooling of engineering resources and bearing building experience of Dodge Manufacturing Company and the Timken Roller Bearing Company has resulted in the development of a new line of all-steel pillow blocks which are said to provide high load-carrying capacity in a compact and rugged package.

High radial and thrust capacities and the stamina to take heavy-shock loads have been provided within minimum dimensions and with far less than usual weight.

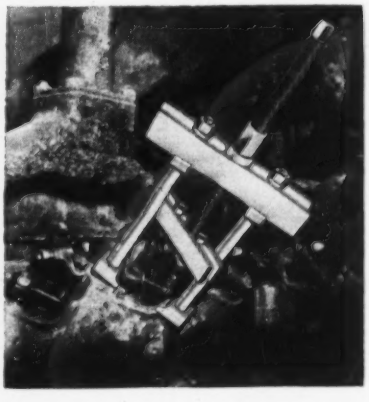
The bearings are fully self-aligning, with spherical outer race, and are available in both expansion and non-expansion types.

Double piston ring seals keep the lubricant in and dirt and dust out of the bearing mechanism. Bearings are sealed both on and off the shaft and are available in shaft sizes from 2-⅞ to 10 in. DODGE MANUFACTURING CORPORATION, MISHAWAKA, INDIANA.

Fuel injection nozzle puller for International diesels

Latest pulling tool with the well-known OTC label is one that has been designed to remove fuel injection nozzles from the cylinder head on all International Harvester diesel engines. The tool exerts a straight, powerful pull and is said to perform in a few minutes a job that often takes hours. It's adjustable and may be used for other pulling jobs as well.

Designated as Puller No. HC-689, it's the latest addition to an evergrowing line (ENR July 19, '51, p. 144, Oct. 25, '51, p. 107, Mar. 13, '52, p. 148). OWATONNA TOOL COMPANY, 380 NO. CEDAR STREET, OWATONNA, MINNESOTA.



Hand truck has ¼-ton hydraulic lift

The photos above show how simple it is to lift and transport heavy items with the new ¼-ton capacity, one-man operated hydraulic lift hand truck. The 440-lb electric motor was merely slid on to the platform while the machine was standing erect. Three strokes of the hydraulic jack foot pedal raised it to easy-tilt height. With the load balanced thus, it was easily transported to a work bench where jacking was continued until the movable platform height was the same as or higher than the work bench. At this point the motor was easily slid off.

An operator can lower the Port-A-Lift platform—loaded or unloaded—at any desired speed from slow to rapid. The lever for lowering control is located on top of the frame directly in front of the tubular handle. The handle of a release valve can be returned to a closed position manually or will return automatically with the first stroke of the foot pedal for another lift.

The model pictured here is J-300. Its platform size is 14x24 in., wheel size 8x2½ in. Height is 52 in., width 24 in., and maximum elevation 36 in. The truck can be equipped with specially designed platforms or bins instead of the usual forks for individual needs. THE PORT-A-LIFT COMPANY, 2998 N. EUCLID AVENUE, BAY CITY, MICHIGAN.

Texaco's lubricating oil also acts as a preservative

When internal combustion engines are taken out of service temporarily for storage or shipment, they must be properly lubricated for service preceding or following the stand-by period and also must be protected against rust and acidic products of combustion while unused.

Instead of tending to these needs with separate products, the Texas Company's new dual-purpose product can be used. Produced in two grades, Texaco Preservative Oil 10 and 30 function both as lubricant and preservative.

Texaco research experts investigated humidity, condensation and corrosion and the resultant product combines special additives developed to insure maximum preservation of internal engine surfaces with motor oil additives of the type used in heavy duty lubricants.

One of many tests requires that steel panels, which have been dipped in preservative oil, should remain free of corrosion after 200 hours' exposure in a humidity cabinet at 100 deg F and 95-100 percent relative humidity. The new Texaco formulation gives such protection for more than 1,000 hours, according to the manufacturer.

In addition to its application in the engines of vehicles scheduled for storage or shipment, the new lubricant-preservative has proved useful in other internal combustion engines in intermittent service. When functioning as a lubricant the preservative oil is compatible with qualified heavy-duty motor oils and need not be changed until the engine has reached its normal drain-and-refill point. THE TEXAS COMPANY, 135 EAST 42ND STREET, NEW YORK, N. Y.

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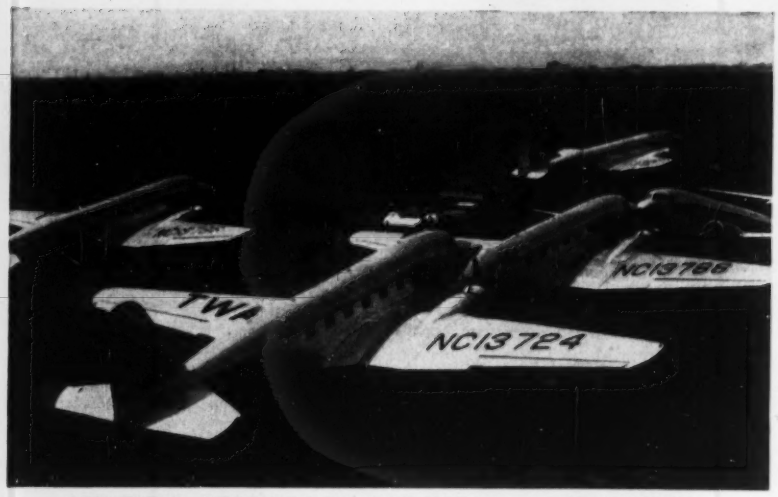

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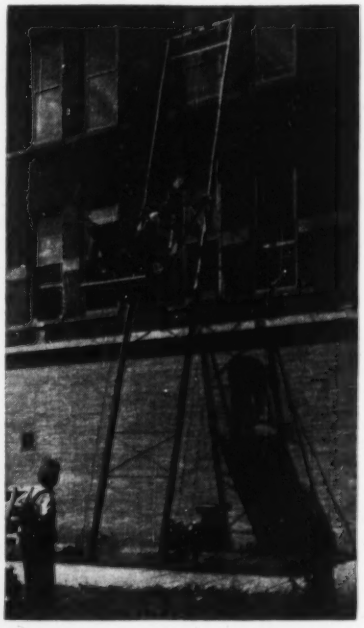


Material elevator handles buggies or ¼-yd bucket

The heavy duty model Roll-O-Hoist material elevator has a special "walk-through" feature for handling concrete buggies.

Rated at 1,200 lb capacity, the new hoist is designed to accommodate a standard two-wheel buggy or can be furnished with a tip-over bucket for handling ¼ yard of concrete with each lift. Cross braces are adjustable every two feet and permit a 6-ft walk-through opening to be made at any loading or unloading level on the hoist, such as the one shown in the picture.

Designated as Model K, the unit consists of a rigid vertical all-steel frame mounted on two pneumatic tires and supporting a platform 47x57 in.

Power is supplied by either a 7½ hp gasoline winch or a 3 hp electric motor. A remote control mechanism enables the same operator to govern both the motor switch or engine throttle and the mechanical brake.

Limit stops at top and bottom prevent the platform from over-traveling, and, as demanded by many state safety codes, a cam-operated safety device secures the elevator to its upright frame in the event of cable breakage. Optional equipment is a built-in centrifugal governing brake which controls the speed of a free-falling load.

Model K is ideal for handling materials of all kinds, according to the manufacturer. Basic height is 32 ft; additional height is secured with 10-ft extensions. CONSTRUCTION MACHINERY SALES COMPANY, WATERLOO, IOWA.

Gear-type tube bender fits right onto tubing

A new universal tube bender is so constructed that it can be positioned on a piece of tubing at any point where a bend is desired. Thus bends can readily be made even when one end of the tube is connected. It can be used to make right or left hand bends, return bends, offset and right angle bends.

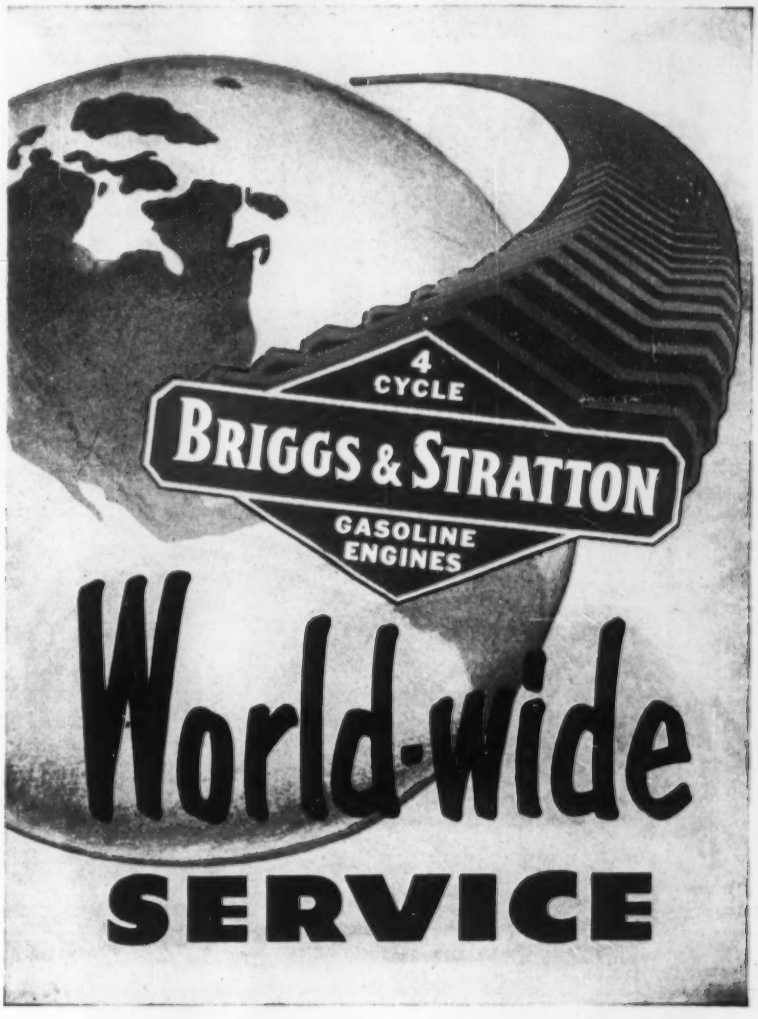
As shown in the photograph, this bending is made easier through high-gear ratio which is of particular advantage when working with hard temper or large size tubing. In addition to being placed directly on a pipe, the bender is designed so that it can be held by hand, clamped in a vise or bolted to a bench. An extension handle permits holding the bender in a pipe vise.

According to the manufacturer, it will bend any type of tubing including hard drawn copper; hard temper, heavy wall steel; stainless steel; aluminum and brass. IMPERIAL BRASS MANUFACTURING COMPANY, 1200 WEST HARRISON STREET, CHICAGO 7, ILLINOIS.

Floor material applied directly over old work

Latex-O-crete is a new type of flooring material designed to resist the destructive action of chemicals, many acids, oils, food fats, solvents and other items which cause deterioration of floors. The product may be applied directly over an old surface at an average depth of ¼ in. and no preparation is necessary other than thorough cleaning.

The material is shipped ready for application with all ingredients proportioned at the factory. It contains no asphalt or other bituminous substances and is said to withstand considerable heavy traffic from materials-handling equipment after interior or exterior application. UNITED LABORATORIES, INC., CLEVELAND 12, OHIO.



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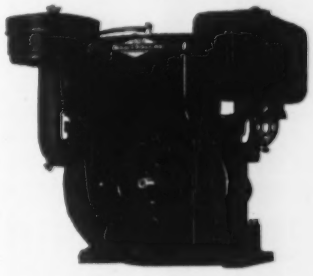

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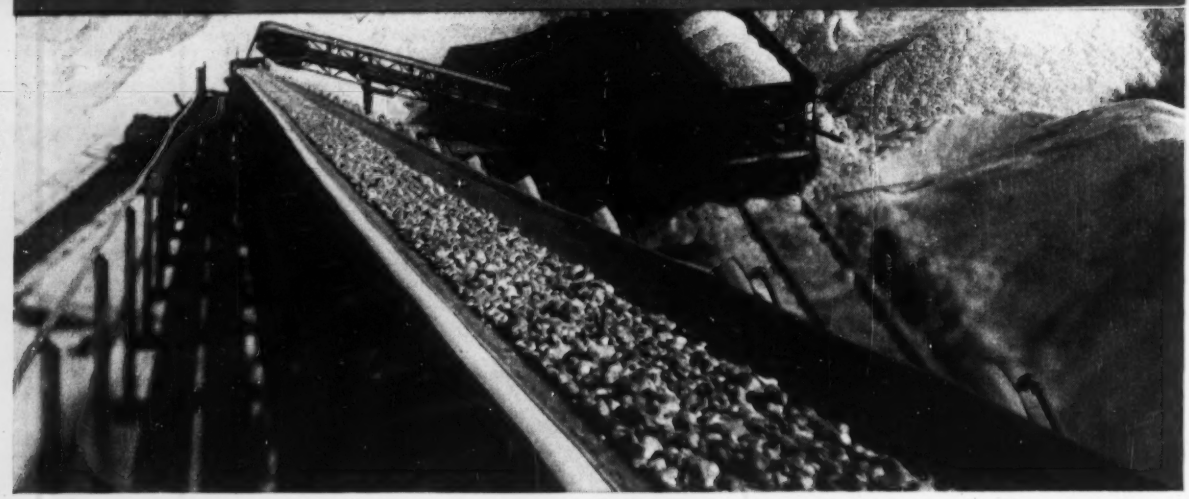

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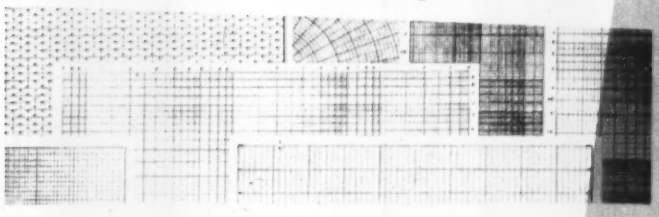

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Integrate the toll roads

CONFUSION, resulting from the lack of interstate highway planning that includes toll highways, becomes more apparent every day. A specific example is found in a project to build a toll road in an east-west direction across New Jersey (ENR Nov. 13, p. 40).

There is great need for more express highways through the densely built-up metropolitan area of New Jersey, some 30 mi deep, to the west of the Hudson River. Beyond that area there is no serious congestion of long duration on the main east-west routes. The highway carrying the greatest volume of trucking—U. S. 22—now has four lanes most of its way across the state to Phillipsburg, and the remainder currently is being widened to four lanes, divided.

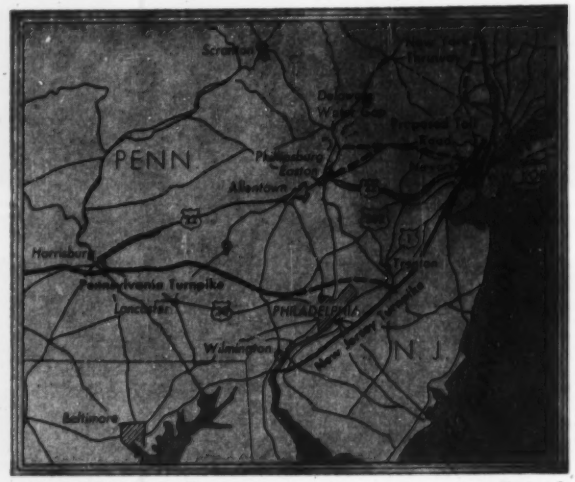
Despite this fact, those who proposed construction of the now-authorized east-west toll road across New Jersey asked the legislature to permit that highway to make Phillipsburg its western terminus in the hope of attracting part of the large volume of traffic now moving through that gateway.

But both the New Jersey Turnpike Authority and the Pennsylvania Turnpike Commission also have their eyes on the very considerable part of the traffic entering New Jersey at Phillipsburg that now uses the original Pennsylvania Turnpike to get through the mountains of western Pennsylvania but leaves that turnpike near Harrisburg and uses U.S. 22 to reach Phillipsburg.

For about half the distance from Harrisburg to Phillipsburg this traffic has a modernized four-lane highway, but the remainder of the distance is over an old road that is badly congested, especially in the Allentown-Easton region. By completing the authorized connection between the eastern end of the Pennsylvania Turnpike and the New Jersey Turnpike below Trenton, the two turnpike agencies hope to offer so superior a route all the way from Harrisburg to the New York metropolitan region that this traffic no longer will leave the toll turnpike at Harrisburg for the free roads.

Hence the New Jersey Turnpike Authority—which has been authorized by the legislature to build the east-west toll road across northern New Jersey—does not favor building that road to Phillipsburg. It favors a northern route to pick up traffic moving through the Delaware Water Gap. However, sufficient traffic to warrant building a modern expressway probably cannot be obtained in that direction as New York's Thruway will soon be picking up the bulk of the long-distance traffic originating in the western part of New York State, some of which now comes down through the Water Gap.

In a lesser degree, similar situations can be found in other parts of the country where toll roads are planned. All of which points to the need for: (1) having the highway planning in any state concentrated in a single agency, and (2) more closely integrated planning for highways forming parts of the interstate network, as was the case before separate agencies were set up to build toll roads.



TOLL ROADS built or under construction in eastern Pennsylvania and New Jersey could be in competition for traffic with a third toll road now projected across northern New Jersey.

At the present time this country has 750 mi of toll highways in service, an additional 1,400 mi actually under construction or authorized, and 1,200 mi under serious study. All but about 200 mi of these toll roads are major expressways that should be important links in the nation's basic network. Planning for them should have been on the basis of how well they fitted into a national pattern, but actually, potential toll revenue had to be the controlling factor.

Fortunately, because potential income is greatest where traffic volume is greatest, most of the toll highways built or planned are through areas where additional highway facilities are needed. But what gives an absurd touch to our present highway planning on a national scale is the fact that not one of the 750 mi already built is considered a part of the national system of the interstate highways, which was authorized by Congress in 1944, because those highways are not part of the federal-aid system. They just do not exist, in so far as that system is concerned.

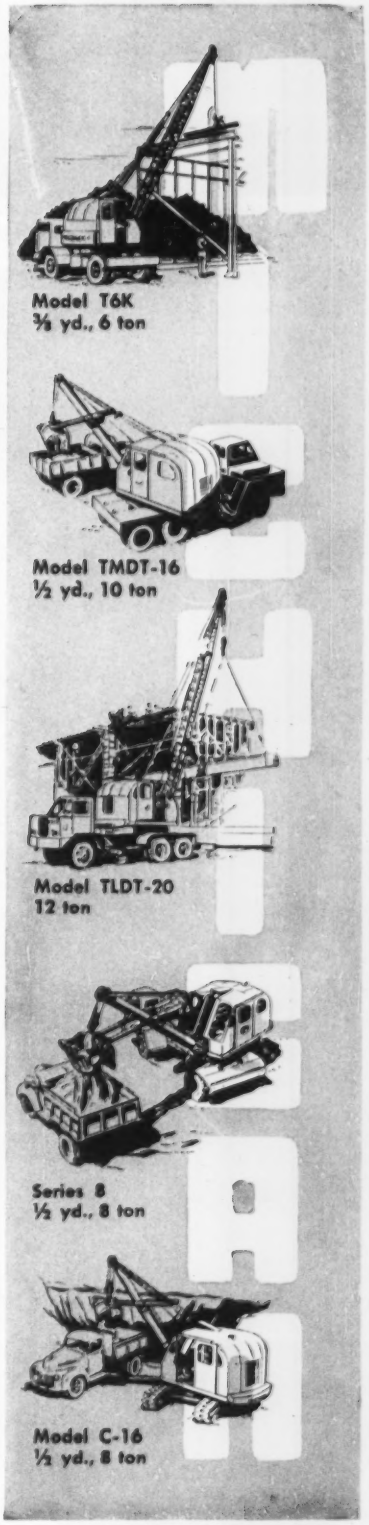
There is no denying the fact that including toll highways in the federal-aid system raises difficult questions. But they are not problems that cannot be solved. Solving them should be made a first order of business by the highway authorities in the new Congress and the American Association of State Highway Officials. Solving them would be a first step toward getting all major highway planning back into the hands of the state highway departments and the Bureau of Public Roads, where such planning belongs and where properly integrated plans can be developed.

Trouble-Free PERFORMANCE

"It's the only machine we've had for any length of time that has had no major repairs." That's what William Wylie, equipment foreman, says about the MICHIGAN ½ yd. Crawler Excavator owned by A. G. Woods Company, Windsor, Connecticut. Yes . . . it's quite a record for an excavator that has been *"worked hard," 10 to 14 hours a day for a year and a half.*

At Woody Crest Housing Development in West Hartford, Connecticut, the MICHIGAN digs service, sewer, water and drainage ditches . . . excavates for septic tanks and basements . . . loads trucks. Digging 450 feet of trench and laying the eight inch pipe is an average day's work.

Service records like this are typical for MICHIGAN Excavator-Cranes. Why settle for less? When you need an excavator-crane . . . investigate MICHIGAN . . . you'll agree it's *your best buy!* Write, wire or phone for complete details.



MICHIGAN POWER SHOVEL COMPANY

500 Second Street, Benton Harbor, Michigan, U. S. A.

Pumps 65 cu. yds. of concrete an hour

...with help of TIMKEN® bearings

THIS model Rex 200 double "Pumpcrete" transports concrete on one or more levels, elevates or lowers it, and distributes it—all in *one* operation!

To insure continuous, trouble-free performance on the job without costly delays that would slow up construction, Chain Belt Company equips sprocket shaft, jack shaft, selective drive gear cases, crank shafts and rocker arm shafts of its Rex "Pumpcrete" with Timken® tapered roller bearings.

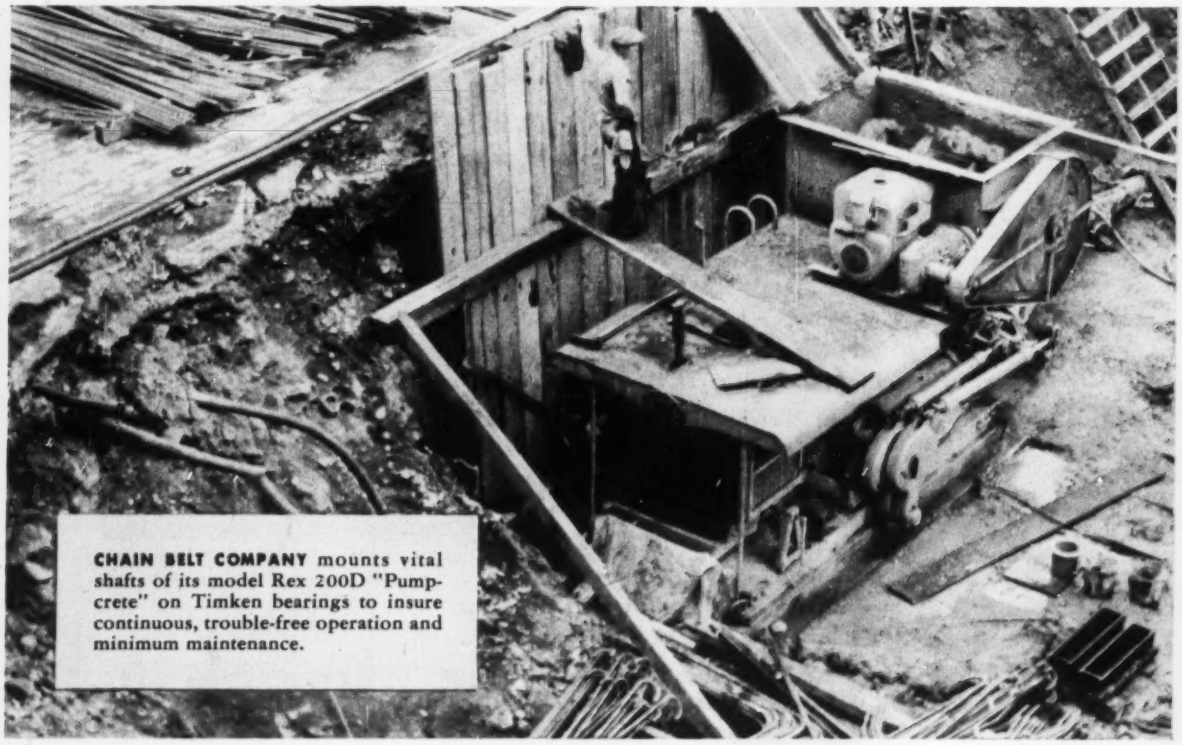
The tapered construction of Timken bearings lets them take both radial and thrust loads in any combination. Line contact between rollers and races gives them maximum load-carrying capacity.

Because they're case hardened, Timken bearings have hard, wear-resistant surfaces and tough, shock-resistant cores which permit them to stand up under the punishing conditions of heavy construction work. Equipment stays on the go, maintenance is reduced.

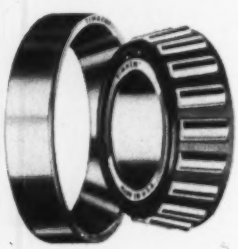
Timken bearings keep moving parts in positive alignment, hold shafts concentric with housings making closures more effective. Lubricant is retained; sand, cement dust, grit and moisture kept out.

You can get all these cost-saving advantages in the equipment you build or buy just by making sure it's equipped with Timken bearings. Always look for the trade-mark "Timken". It's stamped on every Timken bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



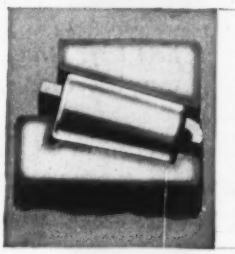
CHAIN BELT COMPANY mounts vital shafts of its model Rex 200D "Pumpcrete" on Timken bearings to insure continuous, trouble-free operation and minimum maintenance.



TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS



GREATER LOAD AREA

Because the load is carried on the *line* of contact between rollers and races, Timken bearings carry greater loads, hold shafts in line, wear longer. The Timken Roller Bearing Company is the acknowledged leader in: 1. advanced design; 2. precision manufacturing; 3. rigid quality control; 4. special analysis steels.

NOT JUST A BALL ○ NOT JUST A ROLLER ⬭ THE TIMKEN TAPERED ROLLER ⬭ BEARING TAKES RADIAL ◫ AND THRUST ◫ LOADS OR ANY COMBINATION ✳